The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Renewal of the Dyestuffs Act

IT is difficult to explain why Major Attlee, the Deputy Leader of the Opposition in the House of Commons, moved his amendment on Monday evening to omit the Dyestuffs Act from the Expiring Laws (Continuance) Bill. Unless, indeed, it was a further assertion of that ostentatious indifference to the fate of the dyestuffs industry that characterised the late Labour Administration. Major Attlee produced no arguments against the renewal of the measure. Nor could any valid argument be produced in favour of throwing open our industry to unrestricted imports of foreign dyes at a time when excess of imports is one of our national problems. The amendment was finally abandoned without a division, and the renewal of the Dyestuffs Act is thus assured for at least another twelve months. Even so staunch a free trade journal as the *Manchester Guardian* was left wondering why the Labour Front Bench had moved the amendment at all. The Labour Party, Major Attlee contended, was neither for Protection nor for Free Trade. In saying that he was surely overlooking the fact that the trade union system is the most intensively protective organisation in the country. Wages, working conditions, hours, apprenticeship systems and all the rest are artificially controlled in the interest of the worker; yet the representatives of this system, which is designed to protect the worker at every point, are mysteriously hostile to the mere mention of protection for industry itself.

But if Major Attlee merely succeeded in illustrating the absence of any real case against the renewal of the Act, the debate provided an opportunity for enabling the Parliamentary Secretary to the Board of Trade to present some very cogent reasons for its continuance. Mr. Hore-Belisha pointed out that whereas before the war we produced 9,000,000 lb. of synthetic dyes, last year we produced 42,500,080 lb., of a value of £879,000. As the result of the working of the Act our dyestuffs industry, which was of mean proportions before the war, provided more than 90 per cent. of our own requirements, furnishing employment for nearly 8,000 highly skilled workmen. While in 1913 we imported 33,000,000 lb., last year we imported only 4,000,000 lb. Our exports, which before the war were insignificant, now totalled nearly 12,000,000 lb.

Chemical engineering, it was pointed out, had also benefited considerably. The permanence secured to the industry had further subsidised research not only in the universities but elsewhere, which had led to the production of new products for colour users. Licences were being granted with great speed, and the increase in the number granted showed there was no impediment in the way of dye-users in this country getting what they required from abroad. In this country in the last year more discoveries had been made and the industry further developed. In no case were our prices greater than the world price for the same commodity. It was, therefore, untrue to say that the textile industry was bearing any undue burden. Mr. Hore-Belisha had the House clearly with him when he claimed we were now entering in our national life into an era of conscious control of industry, and it would be a sad thing if at this juncture we should abandon control of this particular commodity and allow the textile industry to become once more dependent on foreign countries.

Of Transport and Factory Sites

THE transport of material to and from chemical works, considered in conjunction with the movement of solids, liquids and gases from one part of the works to another, rarely receives its due proportion of forethought on the part of those who are laying out new works or adapting existing works. In very many cases raw materials merely enter the works because they must, being needful for the processes carried on within. Acids arrive in carboys when it would be more convenient to take delivery in road or rail tanks, from which the acid can be elevated direct to storage tanks

by means of compressed air—ready for use in bulk, continuously, without additional pumping or labour costs, to say nothing of the monetary saving effected on the price of any such acid "delivered in bulk." At other works the acid arrives by tank wagon when the very nature of the process would be best served by acid in carboys. For some acids, too, there are modern drums constructed in aluminium or special steels fitted with rolling hoops of a design which serves the additional purpose of giving a certain amount of protection against injury.

Inside the works there are many devices applicable for handling materials. Liquids, of course, possess inherent advantages for easy movement, and in a general way the movement of solids has been developed along the lines of obtaining mechanical fluidity. The bucket elevator is used in those cases where it is desired to lift the material a measurable distance; the conveyor is employed for continuous movement, and may be of the worm, scraper, belt, vibrating (grasshopper), or bucket type, according to the class of material to be handled. Modifications are introduced as occasion arises, as in the case of the mechanical raker which evolved from the scraper conveyor for the purpose of removing crystals as they are formed in the evaporation of salt-carrying liquors. The scraper conveyor itself, in contrast to the worm conveyor, finds its chief applications in factories where sludges have to be moved without risk of settling, as they would if handled in a worm. The moving belt or band tackles the problem of continuously transporting large quantities over long distances at an economic expenditure of power. So it is with liquids and gases, as well as solids. There are pumps for all purposes; fans to suck and fans to blow, depending upon the ultimate destination of your gases. Yet there are works where pumps have yet to be properly installed, and where a fan is used to exhaust waste gases when a chimney would serve this purpose equally well.

Factory sites are associated with the question of transport in no small degree. Very few works are so fortunate that they are built upon the very ground which is the source of all their raw material. But it is within the power of those contemplating the erection of new works to consider the facilities offered by factory sites which will reduce the transport of raw materials to a minimum and so aid in cutting cost of production. It may be a question of supplies of acid or of lime or of tar, or merely a question of cheap electric power. But when you have built your factory you will still need railway or road transport to carry your products to users, for the users are scattered far and wide throughout the land when your products are acclaimed to be of outstanding quality.

Mutual Assistance in Taxation

A CARDINAL feature of the Government's plans for equality of sacrifice to meet the national emergency was the lowering of the Income Tax limit. Accordingly in the last few days many thousands of wage-earners who have never before been liable to Income Tax have received assessments for what in most cases must seem staggering amounts. The first result has been a natural and indeed almost inevitable contraction of spending among the wage-earning classes. Several business houses, foreseeing this difficulty, have already made arrangements to advance to members of their staffs subjected to Income Tax for the first time the full amount of their first instalments, deducting the advance by weekly instalments. This very practical measure of mutual assistance during the national crisis may be commended for widespread adoption. If the employer can help his wage-earners to tide over the next month or two, he will not only be creating a new fellowship in industry, but will be helping to restore the balance of trade by countering the instinctive tendency of the moment towards parsimony.

Books Received

BERRYLLIUM (GLUCINUM) AND BERYL. Imperial Institute. London: H.M. Stationery Office. Pp. 26. 6d.

ECONOMIC CONDITIONS IN EGYPT, July, 1931. By R. M. A. E. Turner, assisted by L. B. S. Larkins. Department of Overseas Trade. London: H. M. Stationery Office. Pp. 138. 4s.

SBIANCA E TINTURA. By Guiseppe Prelini. Milan: Ulrico Hoepli. Pp. 277. Lire 30.

The Calendar

November 28	British Association of Chemists: Annual Meeting, 3 p.m. Annual Dinner, 7 p.m.	Palace Hotel, London.
December 1	Institute of Metals (Sheffield Section): "The Technique of Enamelling. Sidney Wilkinson. 7.30 p.m.	University, Sheffield.
2	Society of Public Analysts. 8 p.m.	Burlington House, London.
2 and 4	University of London: Advanced Lectures in Chemistry: "Atomic Reactions." Professor M. Polvani. 5.30 p.m.	King's College, London.
3	Exhibition of Modern Technical and Artistic Glasses: "Safety Glass." J. Wilson. 4.45 p.m.	Science Museum, London.
3	Chemical Society. 8 p.m.	London.
3	Oil and Colour Chemists' Association (London Section): "Chemical Study of Resins." T. Hedley Barry. 7.30 p.m.	30, Russell Square, London.
3	Society of Chemical Industry (Nottingham Section): "The Chemistry of Low Temperature Tars." Professor G. T. Morgan. 7.30 p.m.	University College, Nottingham.
3	Chemical Engineering Group: Joint Meeting with Bristol Section: "Metal Alloys and their Suitability for Use in Leather Manufacture." D. Jordan Lloyd.	
4	Institute of Chemistry: "Discussion on Professional Matters." R. B. Pilcher. 7.30 p.m.	Ca'doro, Glasgow.
4	Society of Chemical Industry (Liverpool Section): "The Manufacture of Glass." R. F. Thomas. 6 p.m.	The University, Liverpool.
4	Society of Chemical Industry (Manchester Section): "Standard Methods for Determining the Rate of Flow of Cotton in Cuprammonium Solution." Dr. D. A. Clibbens. "An Empirical Classification of Vat Dyestuffs." C. M. Whittaker. "The Occurrence and Detection of Certain Faults on Textile Fabrics." O. S. Rhodes. "The Difficulties in the Quantitative Measurement of Dyestuffs Absorption." S. M. Neale. "Further Notes on the Skin Effect on Viscose Rayon." J. M. Preston. 7 p.m.	17, Albert Square, Manchester.

The Transport of Liquid Chemicals

By J. H. West, A.C.G.I.

In the following article the writer discusses the transport of liquids by road tanks, rail tanks, and smaller containers in the nature of drums, a choice of three methods which have their own individual advantages, considered quite apart from the question of costs.

DESPITE occasional troubles with pumps, valves, and pipelines, liquids are much simpler and easier to move about inside the works than solids, but their transport outside the works is another matter. The question of containers or packages is a never-ending source of trouble and worry. In the case of solids, should a package get damaged in transit the chances are that only a very small proportion of the contents will be lost, but in the case of liquids all, or a very large proportion is likely to be missing on arrival. Packages for solids are usually cheap and non-returnable, but containers for liquids are not cheap, and consequently have to be returned in most cases, and this involves extra freight charges and extra work in inspecting, cleaning and reconditioning the returned empties ready for use again. Furthermore the tare proportion is usually higher in the case of liquids than in that of solids, and the space taken up is far greater. This is clearly shown in the following table giving the number of packages of various kinds, and the total weight of liquid, (sp. gr. 1), which can be properly packed in an ordinary 12 ton and 8 ton railway wagon :—

Nature of Package.	12-Ton Wagon. Number of Packages.	12-Ton Wagon. Total Tons Liquid.	8-Ton Wagon. Number of Packages.	8-Ton Wagon. Total Tons Liquid.
90 gallon drums ..	8	3.21	6	2.41
45 gallon barrels..	26	5.22	23	4.62
12 gallon carboys	38	2.04	30	1.61
10 gallon carboys	43	1.92	34	1.52
50 lb. demijohns..	85	2.12	66	1.65
44 lb. demijohns..	100	1.96	75	1.47

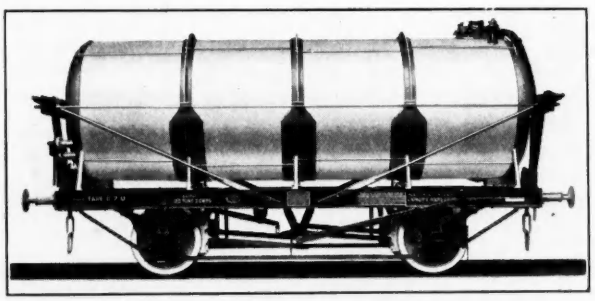


FIG. 1. 20-TON RAIL TANK WAGON FOR ACETIC ACID (ALUMINIUM PLANT AND VESSEL CO., LTD.).

Transport in Drums

This question of bulkiness arises also, of course, as regards storage in small containers both at the manufacturers' works and the consumers' premises. The round shape of barrels and drums is convenient for handling but does not lend itself to close packing. In the case of smaller containers, where the weight does not necessitate rolling, it is difficult to see why a hexagonal shape should not be adopted which would pack together much better and not only save space but reduce risk of breakage. Drums are now in use of aluminium, rubber-lined steel, and "Staybrite" steel. Fig. 4 shows a 90-gallon aluminium drum by The Aluminium Plant and Vessel Co, Ltd. Unfortunately these cost seven or eight times as much as a steel drum, and the "Staybrite" variety twice as much as aluminium. Small metal containers of the demijohn type in aluminium are in use on the Continent, but do not seem to find much favour over here.

Many manufacturers think that there are too many different types and sizes of containers in use, and the question of their standardisation is now being tackled by the British Standards Institution (previously and more familiarly known as the British Engineering Standards Association) who have appointed a Committee to go into the matter in collaboration with the Association of British Chemical Manufacturers.

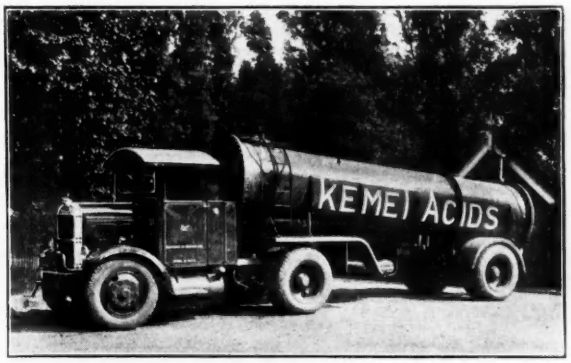


FIG. 2. SIX-WHEEL ROAD TANK WAGON (SCAMMELL LORRIES, LTD.).

The Question of Dangerous Liquids

It is perhaps unfortunate that many if not most of the liquid chemicals are considered by the railway companies to be dangerous, and in consequence are subject to special regulations and extra high freight charges. Some acids and other chemicals can admittedly make considerable nuisances of themselves if they get loose, but it would be very instructive if the railway companies were to publish statistics of the total damage done to their rolling stock and property and the property of others in any year by "dangerous" liquid chemicals. When one remembers the hundreds of thousands of tons of mixed sulphuric and nitric acids, a really dangerous liquid, which were sent by rail all over the country during the War, without anything very terrible happening, one wonders whether the railways, who only take these goods at senders' risk, are not making chemical manufacturers over-insure the risk. As regards the shipment abroad of dangerous chemicals, the Board of Trade has very properly made stringent regulations as to packages and the type of ship on which these goods are allowed to leave our ports. The foreigner, however, is under no such restrictions, and can send dangerous chemicals into this country or other countries in any packages he likes, thus having an unfair advantage over his British competitor. This matter is being attended to by a Committee appointed by the Board of Trade in conjunction with the A.B.C.M. A draft scheme of proposed international

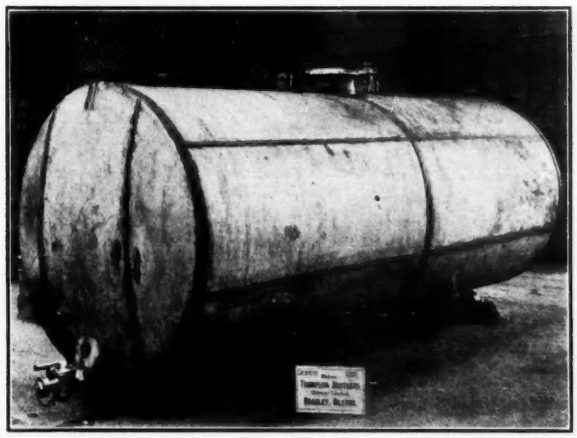


FIG. 3. 3,000-GALLON STAYBRITE STEEL TRANSPORT TANK (THOMPSON BROTHERS, BILSTON, LTD.).

regulations is to be prepared, and this will, probably some time next year, be submitted to an International Conference with a view to bringing the regulations of all countries into line.

Rail and Road Tanks

By far the best and cheapest way of transporting chemical liquids is in tank wagons, either rail or road. Steel tanks for sulphuric acid, benzol, tar, and so on have been familiar for many years, and now tanks of special materials for corrosive liquids are coming into use. The more extended use of tank wagons is delayed in many cases owing to the unwillingness of firms to spend money on storage. It is admittedly less trouble to take delivery in drums or barrels as the case may be, and in comparatively small quantities at a time. Less money is locked up in the stock, and the containers form a very handy storage which can be put in any convenient corner of the yard until wanted, and costs the user nothing at all. Unfortunately the manufacturer takes a different view of this holding up of his drums for three or six months, for he finds that he has to buy four or five times as many drums as he would need if they were always promptly returned. Bulk storage for acids and other corrosive liquids is expensive, but the saving in freight and in the cost of material when taken in tank wagon lots is a distinct consideration, and should be looked into in every case to see how far it would justify the cost of bulk storage.

Returning to tanks of special materials, Fig. 1 shows the external view of a rail wagon with a one compartment tank constructed in aluminium to take 20 tons of glacial acetic acid. Anti-surge baffles are fitted, and also low pressure steam pipes to thaw the acid should it arrive frozen. Emptying is done by compressed air through a delivery pipe dipping into a small sump, since the railway companies do not favour bottom outlets for acid tanks. The ends of the tank are reinforced by dished steel plates, and the whole job, which is by the Aluminium Plant and Vessel Co., Ltd., is a very robust one. Fig. 3 shows a six-wheel road wagon by Scammell Lorries, Ltd., with a one compartment steel tank of 2,000 gallons, lined with semi-hard rubber by Macinlop, Ltd., for the transport of hydrochloric acid. Fig. 4 shows a 3,000 gallon tank by Thompson Bros. (Bilston), Ltd., made of Firth's "Staybrite" steel, and intended for the conveyance of milk by rail.

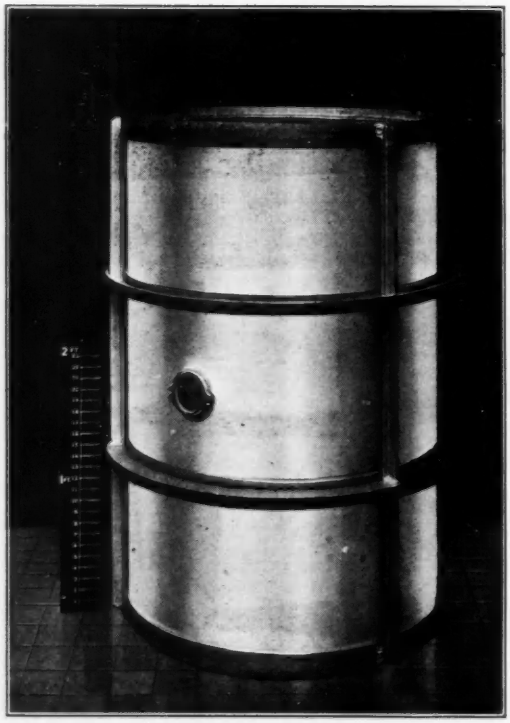


FIG. 4. 90-GALLON ALUMINIUM DRUM FOR NITRIC ACID (ALUMINIUM PLANT AND VESSEL CO., LTD.).

It is interesting to note that the milk trade, which is coming more and more to use tank wagon transport, uses tanks of glass-lined steel, of aluminium, and of "Staybrite," and seems now to be favouring the latter, though probably a sufficiently long experience with them has not yet be obtained to justify a definite claim of superiority over the other materials.

The Economics of Road and Rail

The choice between rail and road tank wagons depends upon particular circumstances, whether the principal customers have their own sidings, and whether the additional cost of road vehicles can be justified. Sometimes the threat to use road wagons is sufficient to induce the railway companies to reduce their rates more or less into line with the costs of road transport, which in most cases are substantially lower than railway rates, provided a reasonably large number of journeys can be made so as to keep down overhead costs. Scammell Lorries, Ltd., state that the cost of running one of their eight-wheeler 3,200 gallon tank-wagons, including labour, fuel and other material, maintenance and depreciation, but excluding interest on capital, is one shilling per mile, or something under twopence per ton-mile allowing for the return journey empty. The cost of such a vehicle, with "Staybrite" tank, is in the neighbourhood of £2,200, and taking 6 per cent. interest on this, and allowing 100 journeys per annum of 100 miles out with 13 tons load, the interest charge is under a farthing per ton-mile. In the case of the milk trade where the vehicles are in practically continuous use all the time the costs are still lower.

Steam Road Transport

The Sentinel Waggon Works, Ltd.

THE rapidly increasing use of "Sentinel" steam wagons, in the design and construction of which revolutionary improvements have been made during the past few years, is evidence of the economy and advantages arising from the employment of this form of transport for handling heavy loads of all descriptions.

As great efforts are now being made to increase the consumption of home-produced goods, the extended use of the steam wagon, which is an essentially British product, showing a definite saving over any other form of road transport, should be encouraged. It is interesting to note in this connection, that in addition to the monetary savings effected by the use of steam wagons, due to their lower running costs as compared with those vehicles of equal load capacity propelled by internal combustion engines, every steam wagon put into service adds an appreciable quota of employment for the miners. Every ton of coal burnt in the boiler of a steam wagon reduces the amount of petrol imported by at least eighty gallons and each steam wagon consumes on an average from seventy-five to one hundred tons of coal in the course of a year. It is easy, therefore, from these figures to realise the very considerable amount of work provided and money retained in the country by the use of steam wagons burning our home produced fuel.

When it comes to a question of the transport of heavy loads —coal and steam can put up a very strong case. We may concede to petrol the lighter loads up to 4 tons, since the steam wagon was never designed to meet the requirements of those who have such loads to handle. But when we come to loads of 6 or more tons the real value of the steam wagon becomes apparent and especially when loads of 10 or 12 tons are in question. Actually the fuel cost of operating a steam lorry is about 33 per cent. of that of a petrol lorry. In other words, to give equivalent fuel costs, petrol would have to be distributed at between 4d. and 5d. a gallon. Apart from fuel cost there are many other points in favour of the steam vehicle, and the most important of these is its essential simplicity. There are no delicate gadgets, such as carburetters or magnetos to get out of order. It has a comparatively slow-speed engine, which ensures a long life to its bearings and moving parts, and the fact that there is no clutch to be operated avoids the imposition of heavy strain upon the chassis. These factors tend to prolong the life of the steam wagon in full utility far beyond what is possible for a petrol-driven lorry. On account of the simplicity of the design of a steam wagon and its more robust construction the cost of

upkeep is about 50 per cent. lower. The very smooth acceleration of the steam engine, the slower speed of its moving parts and the absence of complicated change-speed mechanism and clutches are all contributory factors. In the heavier classes of road transport work, modern coal burning steam vehicles are not only definitely cheaper to operate but are also load for load (owing to their flexibility and even acceleration) indisputably less destructive to road surfaces than internal-combustion engined vehicles.

Commercial Lorries and Light Cars

Morris Commercial Cars, Ltd.

THE rapid rise of the Morris-Commercial organisation to the forefront of the commercial vehicle industry has so completely captured the popular imagination that one naturally expected the display by this well-known firm at the recent Olympia Show to be of outstanding interest. Never before has so comprehensive a range of vehicles been exhibited by one manufacturer. In the Morris-Commercial range there was a vehicle for practically every trade or purpose, including 10-cwt. vans, tippers, or liquid tank wagons suitable for the chemical industry. Prominent among the new models, and one that is likely to become extremely popular in the near future, is the new Morris-Commercial two-ton "Economy" model. This embodies the well-known Morris-Commercial quality and robust construction, and is a really sound engineering job with many outstanding features, such as powerful 4-wheel brakes; fully-floating rear axle; twin rear wheels, and spare complete with tyre; 12-volt, 5-lamp, lighting set with self-starter; chromium plated radiator and full equipment. The chassis is well-powered with a large engine developing over 45 h.p. The wheelbase is 13 ft. which allows for substantial lorry body measuring 11 ft. 6 in. long and 6 ft. 3 in. wide.

For heavier loads this company supplies four-ton, five-ton and six-ton models, which embody the latest technical advances including the patent wheel-out engine with high camshaft arrangement. They have recently built and equipped new body-building and painting shops adjoining the new heavy vehicle works at Adderley Park, Birmingham, and they can offer first-class bodies to special specifications at attractive prices.

Pioneers in Steam Wagon Design

Fodens, Ltd.

THE progress made in the design and development of internal combustion road wagons has been very marked during the last ten years, but this cannot be said to the same extent with regard to steam-engined vehicles. The position, however, has been totally reversed by the introduction of the Foden pneumatic tyred 6-ton wagon, which is built by Fodens, Ltd., of Elworth Works, Sandbach. This design has been brought out to meet the demands for higher speed, greater reliability, enhanced economy in working, and reduced cost of maintenance. The design is entirely new, both in respect to details and principles, and is not simply an improvement on an existing old type. It embodies all the best features of both steam and internal combustion engineering as applied to road vehicles, the result being a wagon of outstanding merit. As in 1901 the Foden was the pioneer of steam road transport vehicles, so to-day this new type of wagon places them in the forefront of the industry. The design of these vehicles embodies nearly fifty years of engineering experience backed up by workshops equipped with the finest types of machines and modern methods of production, coupled with the use of high grade British materials. The results are a type of wagon revolutionary both in design and performance. Its silence in running, remarkable acceleration, extraordinary fuel economy, places at advantage as a heavy-duty vehicle in road transport service. Amongst the many users of Foden steam wagons in the chemical trade are the Bleachers' Association, Ltd.; Bickford Smith and Co., Ltd.; British Glues and Chemicals, Ltd.; Cheshire Gelatines, Ltd.; the Calico Printers' Association; South Eastern Tar Distilleries, and others.

Fodens have also recently introduced a new petrol engined vehicle with a lorry fitted with the Diesel type of compression ignition engine. A user's record for one of these 6/7 ton vehicles shows that that 2,077 miles have been covered at a fuel cost of slightly over one farthing per mile.

Safety in Heavy Road Transport

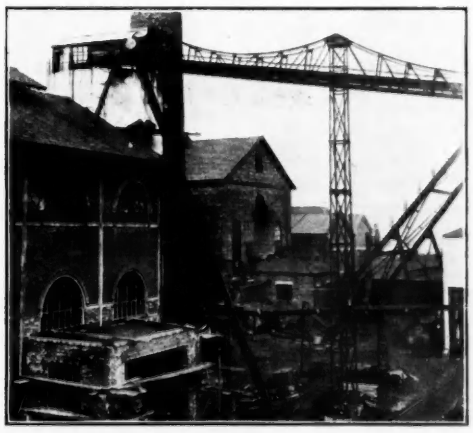
Hardy Motors, Ltd.

AN entirely new British invention of considerable interest to users of heavy motor transport was shown for the first time at the Commercial Motor Transport Exhibition, Olympia, which closed on November 14. This device, known as the Hardy patented auxiliary front wheel drive, is incorporated in all vehicles made by Hardy Motors, Ltd., which firm is allied to the Associated Equipment Co., Ltd., of Southall. The object of this invention is to give additional tractive effort and power to a lorry and enable it to negotiate soft ground and bad roads when necessary, or climb steep hills with heavy loads. It consists of a combination of extra low gears, with all-wheel drive. In actual practice it is not used when driving over good roads at high speed because then the vehicle operates as a standard A.E.C. When bad roads or steep hills are encountered, the driver engages an extra low gear ratio which automatically engages the drive to the front wheels and makes them power driven. The front wheels then pull simultaneously with the back wheels pushing as long as the vehicle is on that special low gear reduction. All driving stresses are distributed over both axles which greatly reduces the strain on the chassis and soft ground and bad obstacles are easily negotiated. The value of this principle cannot be over-estimated when a vehicle has to operate under varied road conditions as the load that can be taken is always limited to the amount which can be carried over the worst section regardless of however good the rest of the road may be.

Conveying Materials "en masse"

Redler Patents

THE accompanying illustration exemplifies in a very practical manner one of the many applications of the Redler "en masse" system of conveying. A hopper receives the coal from the truck and directly feeds the horizontal portion of



REDLER CONVEYOR AS INSTALLED AT WORKS. (REDLER PATENTS).

the machine. This takes in the exact maximum feed and conveys it away around a curve to the vertical (if need be) in a continuous stream which occupies the whole of the internal space in the rising portion of the casing. This "en masse" stream moves upwards at a very slow speed by means of a skeleton chain, without buckets, slats or other ordinary supporting means.

Soviet Exports of Principal Alkalis

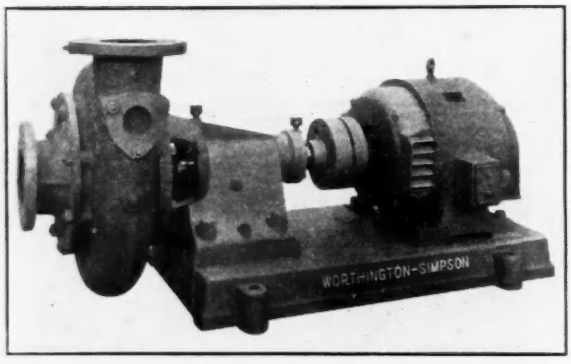
THE Soviet exports of soda ash, caustic soda and sodium bicarbonate during 1930 were 31,487 metric tons compared with 7,498 for the preceding year. During 1930 the principal countries of destination of these commodities were 7,198 metric tons to Germany, 3,697 tons to Argentine, 3,554 to Belgium, 2,707 to Greece and 2,391 to Japan, while smaller amounts went to 18 other countries.

The conveying member of the machine measures only five inches by seven, and the stream is made to travel at the rate of 42 ft. per minute, this being the exact speed of the chain. The capacity, therefore, at this slow speed is very great, being 12 tons per hour for ordinary small coal. In this particular plant a portion of the feed of about 5 tons per hour, is required to be discharged in a receptacle on the way up; and is delivered simultaneously with the remainder, which is continuing its journey to the top discharge. This simple instance is given as being typical of about twenty different types of Redlers for various purposes. It is also indicative of the remarkable advantages accruing to the "en masse" system, which, it will be at once realised, opens up a wide field for adaptations to a large number of industries and solves a great number of bulk-handling problems, which under the older systems would be hopeless. The unique principle—a flowing bulk stream of material—offers facilities, hitherto unheard of, for measuring and blending.

Pumping with Solids in Suspension

Worthington-Simpson Ltd.

THE Worthington-Simpson Freflo pump has been designed to deal with liquids containing solid matter. The impeller will pass solids of sizes depending on the size of the pump, but at the same time, high efficiency is maintained, even under long continuous service. The cast-iron casing of the volute form is of extra thickness to withstand the abrasive action of sewage or similar liquids. It is cast in one piece and bolted to the supporting frame through a large circular flange. The frame flange is recessed to the centre of the casing, thus always maintaining proper alignment of the unit. Both the suction and driving side covers are provided with large size tapped holes to permit flushing the chambers between the



WORTHINGTON-SIMPSON "FREFLO" CENTRIFUGAL PUMP FOR "THICK-PROCESS" LIQUIDS.

heads and the side walls of the impeller. The casing can be rotated on the supporting flange to provide eight different positions of discharge branch. The impeller in this pump has only two vanes which offer the minimum restance to the flow of liquids. All surfaces are smooth, and the space at all points between the vanes is equal to the widths at the periphery. The impeller nub is firmly locked to the shaft which prevents it coming loose during operation, but allows of easy removal. The frame supporting the pump and carrying the bearings is of rigid section and is arranged for bolting to base plate or other foundation. For direct connection to a prime mover, a flexible coupling of the rubber bush and pin type is supplied, which facilitates alignment and ensures satisfactory operation.

Wellington-Simpson, Ltd., of Newark-on-Trent are manufacturers of all types of pumps, condensing plant, compressors, feed water heaters, etc. Special literature, specifications, quotations and expert advice by their engineering specialists will be forwarded on application. They hold stocks at all important cities, and in the United Kingdom have branch offices at London, Birmingham, Liverpool, Cardiff, Newcastle-on-Tyne, Manchester, Glasgow and Belfast.

Fans for Corrosive Gases

Kestner Evaporator and Engineering Co. Ltd.

THE Kestner Evaporator and Engineering Company have, for many years specialised in the construction of fans for handling corrosive gases, which they make in various types and sizes, and in a wide range of different materials. Of these, the most widely known are probably their lead contact fans which are used almost exclusively in connection with the draughting of sulphuric acid plant. For low pressure work; for example, the draughting of chamber plant, their low pressure type fan is usually employed, but, for the draughting of acid concentration plant, where the resistance to flow of gases is higher, their well-known high pressure type fans are used. A special system of homogeneous lead coating is largely used in the construction of these fans. Another type of fan which has wide application is the Kestner earthenware fan. This fan has the advantage that it is resistant to a wide range of corrosive gases and, therefore, has many applications.

In regard to the handling of liquids, the Kestner patent acid elevator has been used very extensively, but the tendency now-a-days is towards cutting down power costs by adopting pumps. The Kestner Company specialise in the construction of glandless acid pumps, which they have developed to a high state of perfection, and which are now available for many different acids. Their glandless plunger pump has a remarkably high efficiency and, being very reliable, is particularly suitable for continuous work in sulphuric acid plants. For weak sulphuric and other acids, their vertical centrifugal type glandless acid pump is more suitable, and has the same advantages with respect to the glandless feature and low maintenance costs.

Carboys and Carboy Hampers

R. and H. Leigh and Sons, Ltd.

R. & H. LEIGH & SONS, LTD., of Orlando Iron Works, Bolton, are the original inventors of all-metal carboy hampers, and for 55 years they have been the leading makers. The old fashioned practice of employing wicker baskets died slowly in many places, but it is now almost obsolete for carboys of British manufacture. In constructing "Zulo" carboy hampers, the steel hoops are deeply grooved, thereby obtaining great strength. One of these hampers when inverted will support a hundred times its own weight without crushing. This may be demonstrated by inverting the hamper, weighing about 9 lb., and gently lowering a weighted cask of about 8 cwt., steadying same upon the hamper; under these conditions the hamper will sustain the weight without weakening. This firm also supplies glass carboys, either packed in hampers or without hampers; safety crates for rail traffic, single carboys and small lots; carboy stoppers, fasteners and rubber caps. Various designs in emptiers are also available, as well as carboy barrows and trucks. Their latest carboy barrow is of an improved design to assist the maintenance of balance in wheeling. This barrow can be fitted, if desired, with Dunlop wheel and pneumatic tyre, the tyre being inflated with a cycle pump.

Specialities in Drums and Kegs

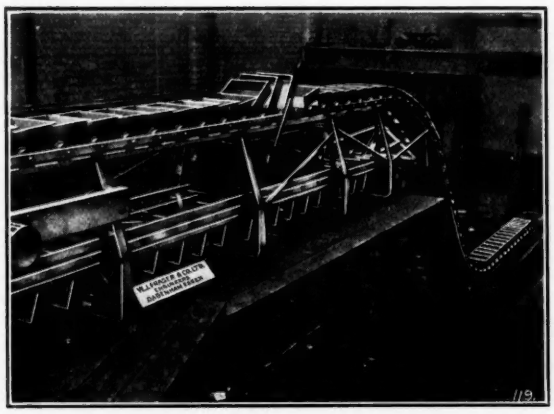
F. Robinson and Co. Ltd.

THE square taper top drum supplied by F. Robinson and Co., Ltd., of Southcoates Lane, Hull, has gained the approval of manufacturers and packers all over the country. This taper is specially notable for the fact that the body and top are made from one piece of metal, obviating any possibility of weakness at the shoulder, and the fact that it sells at the same price as a round, flat-topped drum. It is strong, light, and attractive in appearance, and is made with capacities up to 12 gallons. Another patent held by this firm is the P.T.L. keg. This keg is exceptionally useful for packing powder and semi-liquid products, and is notable for its lever lid, bail handle, special sealing clip, tightly double seamed bottom and welded side seam. It is full opening, attractive in appearance and very strongly made. F. Robinson and Co. also make a complete range of metal containers, from the smallest tin to 50 gallon drums, the taper top drum and P.T.L. keg being but two examples of their products.

Conveyors and Elevators for all Purposes

Bagshawe and Co., Ltd.

THE mechanical handling of all kinds of materials in package and bulk is a speciality of Bagshawe & Co., Ltd., of Dunstable. They have supplied elevators and conveyors for various classes of chemicals, including nitrates, oxides, red lead, soda, sulphur and sulphates. One of their specialities is the gravity roller conveyor, suitable for handling cartons and boxes; such a conveyor can be installed in conjunction with inclined sections for raising the goods from a lower to an upper floor. Other lines include vertical elevators for dealing with sacks, barrels or cases; barrel conveyors as installed at breweries and oil depots; portable belt conveyors designed to handle sacks or cases when loading into lorries; portable bucket elevators for dealing with sludges, ashes, coal, coke, etc. They have installed many bucket elevators in connection with coke crushing and screening plant, the buckets being arranged to pick up the irregular lumps from the boot and carry them to the crusher from which they pass to a grading screen where the finer material is removed. Scraper conveyors are another speciality of Bagshawe & Co. being suitable for the handling of many classes of material. These conveyors can be made horizontal or inclined to an angle of 40 degrees; arrangements can be provided to give delivery at intermediate points between the take-up and the end discharge. An interesting, fully illustrated catalogue, showing various installations, is obtainable from the firm on application.

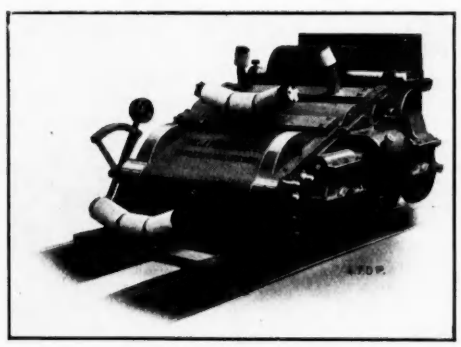


AUTOMATIC TIPPING TRAY CONVEYOR.
(W. J. FRASER AND CO., LTD.)

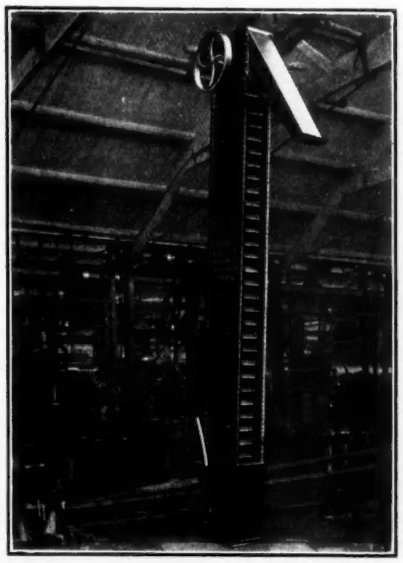
Material Handling Machinery

W. J. Fraser and Co., Ltd.

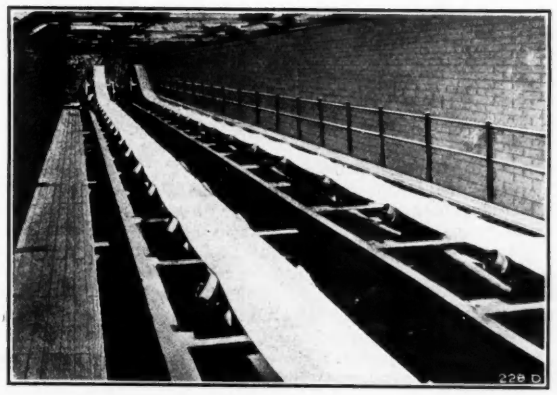
A FULL range of material handling machinery is manufactured by W. J. Fraser & Co., Ltd., of Dagenham, Essex. This includes pan and tray conveyors, particularly suitable for use where materials of all degrees of coarseness have to be transported from a lower level to a higher. One of the accompanying illustrations shows a special design of tray conveyor where the material on reaching the desired point is automatically tipped into a receptacle or chute. Design is varied to suit different materials and delivery rates. Tray and pan conveyors to withstand corrosive materials are made in stainless steel and other resistants. These have been supplied especially for use in the preparation of food-stuffs to prevent corrosion by fruit acids and contamination of the product.



BAND CONVEYOR: BELT TIGHTENING GEAR.
(W. J. FRASER AND CO., LTD.)



CONTINUOUS BUCKET ELEVATOR.
(W. J. FRASER AND CO., LTD.)



BAND CONVEYOR FOR FINE SOLIDS.
(W. J. FRASER AND CO., LTD.)

Band conveyors, also illustrated, are particularly suitable for use where materials have to be transported on the level or where there is no sharp or considerable rise or fall. This type is well adapted for finely divided materials. For direct vertical lifts, Fraser & Co., manufacture the continuous bucket elevator shown in a third illustration. The makers emphasise that the machines illustrated should be taken as typical examples, as to meet individual requirements special designs are often desirable for the greatest economy in running. In this direction the very long experience of the Dagenham firm is at manufacturers' disposal.

United Kingdom Census of Production

Statistics for Chemicals, Dyestuffs and Drugs

The following notes are extracted from the Final Report on the Third Census of Production of the United Kingdom (1924), which was recently published by H.M. Stationery Office, price 7s. net.

THIS Census of Production, relating to Great Britain and Northern Ireland for the year 1924, takes no account of the remarkable changes and developments which have taken place in the period since that date. The number of separate returns received from firms engaged in the chemical and allied trades groups was 3,444, of which 1,013 related to firms whose business consisted wholly or mainly in the manufacture of chemicals, the distillation of tar, or the compounding of drugs and medicinal preparations.

The following statement shows the main results of the censuses of 1924 and 1912:—

	Unit.	1924.	1912.
Value of goods made and work done (gross output)	£'000	56,204	28,841
Cost of materials used	,,	30,768	17,534
Net output	,,	25,425	11,298
Average No. of persons employed	No.	69,245	61,299
Net output per person employed	£	367	184
Mechanical power available:—			
Prime movers	h.p.	168,654	117,426
Electric motors driven by purchased current	,,	68,013	16,665

On account of the restricted character of the Import and Export List of 1907 and 1912, it was possible to specify only a limited number of chemical products whose output was to be stated by quantity and value at the censuses of those years. By the time the census for 1924 was taken the list of chemical products set out in the Import and Export List had been substantially expanded and, in the schedule for that census, 147 headings were specified under which products or groups of products manufactured in the chemical industry were to be recorded. The information is only partially available for publication on account of the risk of disclosing particulars relating to individual firms, but nearly 100 headings are used in the table of output in 1924 appended to this Report as compared with 53 headings under which the output of 1907 and of 1912 was recorded. The following short table, comparing the values returned on schedules for all trades, will, however, give some general indications of the changes over the seventeen years:—

	1924.		1912.	
	Th. tons.	£'000.	Th. tons.	£'000.
Hydrochloric acid	208.5	714	287.2	326
Sulphuric acid	793.6	2,672	1,185.4	1,315
Bleaching materials (including bleaching powder)	98.0	1,170	129.4	534
Borax	7.6	169	17.1	255
Compressed gases	—	915	—	233
Soda compounds	1,531	10,355	952,0	3,711
Coal tar dyes and intermediates	29.2	5,233	—	477
Other coal tar products	—	9,821	—	3,101
Extracts for dyeing and tanning	—	1,085	—	390
Drugs and medicinal preparations	—	15,567	—	4,099
Other chemical products	—	12,188	—	7,378
Total value	—	59,889	—	21,729

Dyestuffs

Intermediate coal tar products for the manufacture of dyes were not recorded as such at the census of 1907, but exports of aniline oil and toluidine in 1908 were 948 tons; in 1924 about 8 per pent. (45,000 cwts.) of the total make recorded under the heading "Intermediate coal tar products used in the manufacture of dyes (including aniline oil and salts, and phenyl-glycine)" was exported, while imports were unimportant.

In 1907 about 6,950 tons of coal-tar dyes were produced; in 1924 the output had grown to 19,000 tons. Particulars furnished to the Dyestuffs Industry Development Committee permit of a classification of output in certain groups and the following table summarises the information thus compiled for 1924:—

	Th. lb.
Direct cotton colours	5,059
Acid wool colours	5,193
Chrome and mordant colours (including alizarine)	6,940
Basic colours	1,561
Sulphur colours	7,833
Vat colours (including indigo)	5,004
Dyestuffs for lake-making	754
Oil, spirit and wax colours	899
Total	33,243

The following table shows the production for sale in 1924 of dyes, dyestuffs and extracts for dyeing, tanning, etc.; particulars of the exports and retained imports in that year are also shown:—

	Production.		Exports.	Net imports.
	Th. cwts.	£'000.	Th. cwts.	Th. cwts.
Intermediate coal tar products including aniline oil and salts)	204.4	1,200	45.3	0.6
Finished dyestuffs	379.4	4,033	59.1	70.2
Extracts for dyeing	78.4	159	6.1	115.1
Extracts for tanning:—				
Quebracho	514.7	286	29.7	352.1
Other descriptions	821.7	524	31.0	760.0
Extracts for dyeing, tanning, etc	—	116	—	—

Extracts for dyeing and tanning were returned in 1907 by value only and the recorded production amounted to £322,000, in addition to which the returns showed dyewoods and tanning materials (ground or prepared) to the value of £98,000. The latter heading does not appear in the 1924 census, but the value returned for tanning and dyeing extracts was £1,085,000. Retained imports of dyewoods in 1924 were 2,181 tons against 24,690 tons in 1907. The retained imports of tanning substances were, in the aggregate, but little less in 1924 than in 1907, so far as the available particulars for the earlier year suffice for a comparison. It would appear that the direct extraction of dyestuffs from dyewoods has declined largely since 1907, and that the direct contraction of tanning material from barks, etc., has not increased. On the other hand the retained imports of extracts for dyeing and tanning, which were recorded by value only in 1907 at £727,000, were valued in 1924 at £1,331,000. Exports of dyestuffs (other than those derived from coal tar) were 9,227 tons in 1907; exports of tanning extracts were not then shown separately.

Other Coal Tar Products

In this group are included the by-products recovered in the course of the manufacture of gas and coke at gasworks and coke ovens and the by-products recovered from the distillation of crude tar and ammoniacal liquor by chemical manufacturers. The output of intermediate products for the manufacture of dyes and of finished coal tar dyes has been dealt with in the preceding section. The following table shows, for 1924, the total production of the chief classes of coal tar products (other than dyes and intermediates), together with particulars of exports and retained imports:—

	Unit.	Chemical Trades.	All Trades.	Exports.	Net Imports.
Anthracene	Tons	994	5,718	118	279
Benzol	Th. gals.	11,796	51,776	1,159*	4,713*
Toluol	Th. gals.	373	741	55	—

	Unit.	Chemical Trades.	All Trades.	Exports.	Net Imports.
Carbolic acid (phenol)	Th. gals.	938	1,108	—	—
	Tons.	5,683	7,191	5,702	49
Naphtha	Th. gals	3,428	5,841	170	17
Naphthalene	Tons.	6,282	16,480	2,114	546
Tar oils, creosote oils, etc.	Th. gals.	50,870	90,548	45,322	403

*Exclusive of benzol which may have formed part of the exports or imports recorded as motor spirit.

The following table gives particulars recorded for 1924, relating to inorganic acids:—

	Chemical Trades. Th. tons.	£'000	All Trades. Th. tons.	£'000
Hydrochloric acid*	208.5	714	208.5	714
Sulphuric acid†	619.5	2,149	793.6	2,672
Boric acid	2.9	117	2.9	117
Nitric acid	8.0	186	13.7	354
Other descriptions	4.5	128		
Total	843.4	3,294	1,018.7	3,857

*At 1.14 specific gravity. †At 1.7 specific gravity.

Manufacturers of chemicals, dyes, explosives, and fertilisers were required to state their total make of sulphuric acid but the operators of gasworks and coke ovens were not similarly required to state the quantity of acid made by them for use in their recovery work, and it is understood that the inclusion of such production might add about one-fifth to the total returned to the census office. It should also be noted that the returns made to the census office were not in all cases made for the calendar year 1924 but for the business year most closely corresponding thereto in the case of individual firms. There must, therefore, be discrepancies between the census aggregate and any trade estimates made for the calendar year. The output of sulphuric acid in 1907 was estimated to be 1,459,000 tons at 140° Tw. (sp. gr. 1.7), and the reduction in output is connected with the decrease in the production of superphosphate fertilisers. The output of 62 firms making hydrochloric acid in 1907 was 419,325 tons at 29° Tw. (sp. gr. 1.145), and 46,922 tons of unknown strength, while the output of five firms making only for their own use was not known. Exports in 1924 were 134 tons of hydrochloric acid and 1,561 tons of sulphuric acid, the strengths not being recorded; retained imports of hydrochloric acid were nil and those of sulphuric acid were 37 tons.

Potassium and Sodium Compounds

Manufacturers were asked in 1924 to state their output, under thirteen headings, of potassium compounds and as many of soda compounds, but, in order to avoid the risk of disclosing information regarding the output of individual firms, only limited details are given. The following table shows the production for sale or stock and selling value, as returned on schedules for all trades:—

	Tons.	£'000
Potassium compounds:—		
Chloride	640	4
Cyanide	150	20
Iodide	100	197
Sulphate	570	6
Other	6,350	282
Total	6,810	509
Sodium compounds	Th. tons 1,531	10,355

Potassium compounds were not shown separately in 1907; the quantity of sodium compounds returned as made for sale or stock was 707,000 tons in 1907, excluding chromates and cyanides, which are included in the figures for 1924 shown above. Exports of potassium compounds in 1924 were about 4,400 tons, of which chromates and bichromates were nearly 1,800 tons, refined saltpetre about 900 tons and refined kainite about 600 tons. Excluding crude kainite and saltpetre, the retained imports were 35,900 tons in 1924, the chief being chloride, 18,700 tons, and sulphate, 8,500 tons; imports of chromates, cyanide and iodide were negligible.

Ammonium Compounds

Details of the production of ammonia and ammonium compounds in 1924, together with selling value, are here given as returned on schedules for all trades:—

	Tons.	£'000
Ammonium compounds:—		
Carbonate	3,650	120
Chloride	8,830	245
Other (including anhydrous ammonia but excluding ammonium sulphate)	26,210	404
Total	38,690	769

In addition to the ammonium compounds shown above, a total production of 41,650 tons of ammonium sulphate was recorded on schedules for the chemicals, dyestuffs and drugs trades; 670 tons were used for further manufacture in the works in which it was produced and the remainder, 40,980 tons, was valued at £498,000. Ammonium sulphate is the only ammonium compound which was separately specified in 1907, when 28,000 tons were produced by chemical manufacturers. Up till recent years the chief source of this fertiliser has been the by-product recovery plants at gasworks, at coke-ovens and blast furnaces, and at oil-refining works. With the development of the extraction of nitrogen from the air the chemical industry proper has come to play a very much more important part in the production of sulphate of ammonia. The increase since 1907, about 55 per cent., has been mainly due to the substitution of coke-ovens with by-product recovery plant for behive ovens.

Exports of sulphate of ammonia were 231,000 tons in 1907, 285,000 tons in 1912, and, in 1924, 278,000 tons. The quantity retained for use in the British Isles has, therefore, risen from 31,000 tons in 1907 to 148,000 tons (together with the production in the Irish Free State) in 1924. Imports were negligible in all three years. Exports of ammonium chloride were 7,720 tons in 1907 and 6,506 tons in 1912, retained imports being 241 tons in the former year and 369 tons in the latter.

Organic Acids

	Production. Tons	£'000	Exports. Tons	Net Imports. £'000
Acetic (including acetic anhydride)	3,120	109	100	8,820
Citric, tartaric and tartrates	4,090	496	1,180	1,700
Oxalic and oxalates	30	4	10	790
Salicylic (including salicylates but excluding aspirin)	540	84	80	30

The imports of oxalic acid were greater than the home production; over 60 per cent. of the home supplies of citric and tartaric acids were of British manufacture and British-made salicylic acid and salicylates commanded the home market for those products. In 1907 an output of 6,000 tons of acetic acid was recorded; in 1924 little more than half of this amount was produced. Imports of acetic acid were first recorded in 1908, when 2,990 tons were retained. The quantity available for use in the United Kingdom in 1907 appears to have been about 9,000 tons, of which about two-thirds was of British make; in 1924 the quantity available had risen to 11,840 tons, of which a little more than one-quarter was made in the United Kingdom. The output of wood distillation products (other than acetic acid), including mordants, was valued at £98,000 in 1907, of which £80,000 was returned on schedules for the chemical trades, and the output in 1924 was valued at £155,000 (including methyl alcohol). The retained imports of non-potable methyl alcohol fell from 446,000 gallons in 1907 to 408,000 gallons in 1924; at the same time British exports of non-potable methyl alcohol, which amounted to 130,000 gallons in 1907, were reduced to 21,000 gallons in 1924.

Alleged Breach of Oil Contract

In the King's Bench Division on Thursday, November 19, Mr. Justice Branson, sitting without a jury, began the hearing of an action brought by the Polaris and the Globus Companies, of Hedrum, Norway, owners of whale oil factories afloat, against Unilever, Ltd., and others, claiming damages for alleged breach of contract dated February 10, 1931, to buy a year's output of whale oil. Mr. Macaskie, K.C., for the plaintiff companies, said the Polaris Co. claimed £263,466 and the Globus Co. £183 694. Delivery of the oil in plaintiff's tankers, it was alleged, had been refused. The hearing, continued on Friday, November 23, was again adjourned.

A Choice of Factory Sites

Facilities offered by Sites adjacent to Railways

We give below some notes on the facilities offered by factory sites on two of the important railway systems operating in this country, one of which—the L.N.E.R.—serves important industrial areas where many chemical factories are established, included among which are the I.C.I. Works of Synthetic Ammonia and Nitrates, at Billingham.

THE London and North Eastern Railway serves east and central Britain between London and the North of Scotland, whilst its lines also extend westward to Mallaig, to Glasgow and the Clyde, to Carlisle and Silloth, to Manchester, Liverpool and the Mersey and to North Wales. The Company operates 7,000 miles of railway line, and owns 288,000 wagons, carrying in a normal year 180,000,000 tons of goods and minerals. They have direct rail access to London's immense system of docks through the principal stations such as Goodman's Yard, Millwall, Blackwall, Canning Town and Victoria and Albert Docks, carrying a large proportion of the imports and exports which pass through them.

Of the towns in Great Britain with over 50,000 inhabitants (exclusive of London) no less than 80 per cent are directly served by the L.N.E.R. The Company possesses 38 docks, 33 miles of quays and 210 coal shipping berths and is the largest railway dock owner in the world. Of the principal ports in Great Britain (judged by the combined value of imports and exports) the following are directly served by the L.N.E.R., viz., Aberdeen, Blyth, Boston, Burntisland, Dundee, Glasgow, Goole, Granton, Grimsby, Immingham, the Hartlepools, Harwich, Hull, Ipswich, King's Lynn, Leith, Liverpool, Birkenhead, London, Lowestoft, Manchester, Methil, Middlesbrough, Newcastle and the Tyne, Parkeston Quay, Sunderland and Yarmouth. Extensive improvement schemes are at present in hand at some of the L.N.E.R. ports; at Parkeston Quay a large extension is being built with three additional berths, whilst new warehouses, power mains, electric cranes and other improvements are being installed at practically all the ports on the East Coast to ensure the facilities being up to date. All the modern sources of power are obtainable under favourable conditions, whether coal, electricity, waste gas or fuel oil. Yorkshire, Durham, Northumberland and the Clyde Valley possess cheap and abundant supplies of electrical power, and many of the new central power stations built or contemplated by the Electricity Commission are within the territory of the L.N.E.R.

The North Eastern Counties

There is hardly a trade of importance which is not successfully carried on within the L.N.E.R. territory. The advantage of locating subsidiary trades in close proximity to the raw material of their particular trades and adjacent to ports served by regular lines of steamships to and from the continental and overseas ports is obvious, and from this point of view the resources of the L.N.E.R. are admirable. The chemical trades in various places yield a considerable amount of by-products of value to manufacturers. In the Tees-side area firms requiring ammonia as their raw material can now obtain suitable land in the immediate vicinity of the Synthetic Ammonia and Nitrates Works at Billingham. A plentiful supply of electrical power in many parts of the area served also affords special facilities for electric and electrolytic processes. There are large deposits of chalk on the Yorkshire and Lincolnshire Wolds, in Hertfordshire, Bedfordshire, Cambridgeshire and elsewhere in the eastern counties, suitable for making cement, plaster, distempers, etc. There are also large deposits of gypsum, limestone and ganister available.

Modern L.N.E.R. practice permits of every problem in transport being examined and solved, whether it be the conveyance of a huge electric transformer from the works to the site, or the delivery of a small package from a mail order firm to an outlying farmstead. Among the facilities provided by the Company in their efforts to develop commerce, mention should finally be made of the intelligence service which it offers to manufacturers who are seeking sites for new works. An up-to-date and exhaustive record is kept at headquarters of vacant factory buildings, and valuable sites together with general information in regard to costs of power, rates, labour, etc., and an inspection of this record is gladly invited. There is immense scope for new industries on the L.N.E.R. lines whether they be located in London and its satellite towns, at the East Coast ports, or in the older industrial areas of the Midlands and the North.

The West of England

The Great Western Railway, which Company has the experience of a century of transport, can offer a system of express freight trains, giving a next day delivery to many important towns. This Company has also developed rail-head distribution schemes which now operate over a radius of 30 miles from Bristol, Cardiff, Exeter and Swansea, bringing remote villages into close touch with manufacturing centres and offering an economical and speedy method of distribution. A large stock of road-rail containers are available for the conveyance of all descriptions of merchandise, giving a door to door service, which is superior in all ways to that offered by road transport. These receptacles enable packing to be reduced to a minimum, enabling economies to be effected in packing costs, and carriage charges while the risk of damage is reduced to a minimum. To meet the demands of firms whose products are distributed in country districts, the G.W.R. has country lorry services operating from 142 stations, serving the surrounding country within a radius of 20 miles. It will therefore be apparent that this Company is alive to the demands of the trading public and these facts should be borne in mind when the site for a new works is decided upon.

The London Area

The increasing tendency of industry to move southwards has turned the eyes of traders to the districts surrounding London. In these days of model factories it is desirable, if not essential, that the site chosen should be in a district where the atmosphere is as free as possible from the smoke and grime which emanates from every large city. In Britain the prevalent wind is from the west and south-west; the western suburbs of any large town must, therefore, enjoy a far more salubrious atmosphere than those of the east or north-east, consequently traders looking for suitable factory locations around London will do well first of all to explore the possibilities of the western suburbs. Many attractive sites are still available close to the G.W.R. station at Park Royal, while at Perivale an important syndicate has recently acquired a huge tract of land for industrial development adjoining the G.W.R. main line and the new arterial road, Western Avenue. Rail sidings are being provided and the estate is also served by the Grand Union Canal. Gas, water and electricity are available at low local rates as these services have been prepared for in planning this area for factory purposes. Industrial electric supply is £8 per annum, maximum K.V.A. demanded, plus 0.4d. per unit for the current consumed; or £4 per annum, maximum K.V.A. demanded, plus 0.75d. per unit for the current consumed. Gas is 0.2d. per therm (3/10d. per 1,000 cubic feet). A few miles south of Western Avenue and running almost parallel with it is the Great West Road, and here again developments have been so rapid that the Great Western Railway Co. has been compelled to open a new Goods Station, Brentford Town, to cope with the additional traffic, and a considerable area of land has been acquired alongside the new station for firms wishing to establish factories. This property, which will be served by sidings, possesses the added attraction of canal frontage and proximity to the main arterial Great West Road.

An Ideal Trading Estate

At Slough, the Slough Trading Estate Co. has upwards of 100 firms established on its estate, and is still extending its activities. Numerous ready-built factories are available for letting on lease at moderate rentals. The Estate Company also has a good selection of sites, fully developed, and ready for letting on long lease to firms preferring to build their

own factories. This estate is connected to the Great Western Railway main line by siding, and practically every building and site has siding facilities alongside.

Many suitable sites on the Great Western Railway system are to be found around the important docks at Newport, Cardiff, Benarth, Barry, Port Talbot and Swansea. These ports are equipped with the most modern appliances for the rapid handling of general cargoes, and factories erected in the vicinity are within easy distance of the South Wales coalfields, thus ensuring adequate supplies of cheap coal. The Port of Bristol has recently acquired a large area of land adjacent to its well-known ocean docks at Avonmouth. Known as the "Chittening Estate," this site comprises an area of approximately 270 acres on which some eighty buildings have been erected, the majority being grouped and centralised. The estate is bounded on the south by the Great Western Railway connecting with the main lines to the North, the Midlands, and also to South Wales via the Severn Tunnel, while through connection is afforded to London and the Eastern Counties. It has rail and road facilities connecting with Avonmouth Docks and Bristol, and easy communication with all the arterial roads is afforded. There is an excellent water supply and miles of steam-heating pipes which serve the factory and other structures. Electrical connections for power and lighting are available, and the site is outside the rateable area of the City of Bristol.

Industrial Property Market Conditions

Reported Increase in the Demand for Sites

ABNORMAL activity is foreshadowed by the large number of enquiries now in hand with the leading factory agents up and down the country. A report from Chamberlain & Willows, the industrial property specialists of Moorgate, London, E.C.2., gives valuable indication of the coming development in the chemical industry and allied trades due to the recent political events. This well-known firm has been established for more than 18 years. Its activities, while centred on the disposal, erection or letting of factories and sites cover a very large field besides. In addition to the existing five branches which cover the London area, facilities are available for provincial business all over the British Isles. It is Chamberlain & Willows' experience that overseas business men, realising that land values are bound to increase considerably with the advent of tariffs, are losing no time in investigating the industrial property market conditions. The most favourable sites are rapidly being secured, notably on the southern outskirts of London and others in the eastern provinces. The number of sites suitable for the chemical industry is of course limited and delay is likely to prove expensive. This is well indicated by the recent deals in sites and properties, some of which have been concluded at greatly enhanced prices compared with those ruling but a month or two ago.

Developments at Hull,

An Ideal Situation for Factory Sites

INFORMATION helpful to industrialists and traders who are considering the setting up of new works or branch plant in Great Britain, or the opening of more convenient distributing centres, is contained in a series of brochures which have been issued by the City of Hull Development Committee. Hull is the third largest and the cheapest port of Great Britain, and has regular steamship services with all parts of the world, thus ensuring a steady supply of raw materials from overseas. There are, at present, ten docks with a water area of 210 acres, two riverside quays and two oil spirit jetties; extensive warehouse and storage accommodation is also provided, together with a sufficiency of facilities for the quick loading and discharge of ships. Gas, fuel oil, water and electric power are all available at reasonable cost with discounts for large users; coal is especially cheap as Hull, itself, is on the edge of the Yorkshire coalfields and is the national coal port for that district. Assessments on industrial property are on a low basis. In certain areas outside the city boundary, where certain advantageous sites are situated, the rates are as low as 9s. 8d. in the £. The Hull University College provides facilities for industrial research.

Viscose Dyeing

Some Random Notes on Works Tests

THE Manchester Section of the Society of Dyers and Colourists held their third meeting of the Session in the Lecture Room of the Literary and Philosophical Society, 36 George Street, Manchester, on Friday, November 20, when Mr. F. Scholefield presided at a lecture entitled "Random Leaves from a Viscose Yarn Dyers' Note Book," was delivered by Mr. C. M. Whittaker.

The Migration Test

The lecturer said he had chosen the title for his lecture with the deliberate purpose that he could jump from subject to subject without making any apologies. In the first place he wished to make reference to the dyeing of acetate yarn, and what was termed the migration test. This was an excellent proof of the solid solution of the theory of dyeing acetate yarn. A portion of a skein was dyed with a fast yellow colour, and the skein was then washed and immersed in plain water for half an hour at 80° C., whereupon the dyestuff migrated right round the skein. There were considerable differences between a large number of dyestuffs in regard to their solubility in cellulose acetate. Therefore, in making tests over varying durations of time it would be found that during one period of time there was complete migration. When this was the case it was possible to classify the acetate yarn dyestuffs for rate of dyeing, and so get better dyeing mixings than would otherwise be the case. He was accustomed to use a large amount of vat dyestuffs for warps and wefts for casements, and it had been his habit to go round the firm's examining room, and take out, at random, skeins dyed with vat dyestuffs and expose them to light. This practice has caused him to experience many shocks, for it was really surprising how one could dye with the same dyestuff, and at one time find it to be fugitive and another time fast to light. Efficient soaping was requisite in order to develop the shade and proper fastness of a vat dyestuff, but if there was excessive soaping of vat dyes there was sometimes a depreciation in the fastness. Personally, he protested against the abuse of the use of the German Fastness Commission numbers. Perhaps it would be read on a German card that a colour was 8. This was quite inaccurate, as "8" in the German Colour Fastness Commission's standard was a definite percentage of Indanthrene Blue dyed under specified conditions, and unless all depths of that colour would withstand the same exposure there was no justification for exposing it as 8. He suggested that colour makers should cease to use the figure "8," and that they should definitely state the percentage of dyestuff used.

Temperature and Salt Sensitivity

Turning to the subject of temperature range tests Mr. Whittaker said that a particular blue sample exhibited had only begun to get full at a very low temperature. His advice to all research workers was to be courageous and discard anything once it had proved to be wrong. Personally, he had discarded the temperature range test just in the same way that he had discarded the suction test, simply because he had found something better.

The salt sensitivity test was another matter which deserved more attention. This test had been carried out by him on a range of eight shades because it had been found that eight skeins could be obtained from one commercial skein, and the same type of viscose could be dealt with all the way through. It was remarkable what a great difference only 2 per cent. of salt made in the ultimate dyeing results, and, incidentally, it was a clear indication of how much excess salt was poured down the drains of dye houses. Those dyes which dyed on quickest covered up the light and dark effects the best. The method of providing light and dark yarn by making it with caustic should be dropped, as it was too crude and unreliable. Unless a colour soaped off, and went on dyeing on the other portion of the material until there was a reasonable equilibrum in the dyebath, it was not to be expected that an even colour would be obtained. He (the lecturer) had been very dissatisfied with the temperature range test because it did not disclose sufficient information. There were variations with each colour. In the case of a sample shown of 21 filaments and 36 filaments, 30 denier, the 21 filaments were the darker but the 36 was always the darkest to start with.

The Industrial Compounds of Fluorine

By G. Malcolm Dyson, Ph.D., A.I.C.

So reactive an element as fluorine is seldom, if ever, met with outside the various laboratories where it is prepared for research or academic purposes; nevertheless, the compounds of this element form a substantially important section of the inorganic chemical industry, as is evident from the following article.

THE occurrence of fluorine in nature is mainly as the calcium fluoride mineral, fluorspar, and also as the double fluoride of sodium and aluminium, cryolite, a mineral which is utilised in the aluminium industry for communicating a conductivity to the fused bauxite. In addition, small traces of fluorine are found in nearly all soils and in nearly all plants that are grown therefrom.

Conversion of Calcium Fluoride

The trade in fluorspar fluctuates considerably, the United States being the chief producer. In 1921 the U.S. production amounted to 179,796 long tons; that in this country to 54,683. These two countries together produced over 80 per cent. of the world production. In 1922 the figures for the same countries were 118,981 and 33,343 tons respectively. The main use of calcium fluoride is in smelting operations, where it gives fluidity to the slag and enables a more economical separation of the metal from slag to be made. In addition various attempts have been made to use calcium fluoride as the basis for the extraction of sodium hydroxide directly from brine without the use of sulphuric acid. The reaction depends on the fact that if lime and sodium fluoride are heated together in aqueous solution the following reaction takes place:—

$$2NaF + Ca(OH)_2 = 2NaOH + CaF_2.$$

This reaction, yielding as it does one insoluble component, is almost independent of the concentration at which it is carried out, and thus affords a means of producing very strong caustic liquors without the necessity of evaporating a weaker solution.

The production of the requisite sodium fluoride is done by means of the following series of operations. The calcium fluoride in the wet condition from a previous run is suspended in saturated brine and silicon fluoride gas is passed in; this precipitates sodium silicofluoride:—

$$CaF_2 + SiF_4 + 2NaCl = Na_2SiF_6 + CaCl_2$$

The precipitated sodium silicofluoride is then heated, when decomposition takes place, silicon fluoride passing off as a gas, and sodium fluoride remaining in solid form. The process was protected by E.P. 7.277 (1837); 413 (1858) and 269,491 (Meyerhof and Buchner). Needless to say, the process is only of historical interest to the chemical industry at the moment. The drawbacks associated with the process is the difficulty of conducting the decomposition of the sodium silicofluoride in an economic manner, since it is a reversible reaction, and only at 700° C. is the partial pressure of the SiF_4 equal to atmospheric: the second disadvantage lay in the fact that during the heating of the silicofluoride a solid solution of much higher melting point is formed, when only 12 per cent. has been decomposed, which leads to the retention of some unchanged silicofluoride in the mass of the sodium fluoride. This reacts with lime to give

$$Na_2SiF_6 + 3Ca(OH)_2 = 2NaOH + Si(OH)_4 + CaF_2$$

leading, in the case of strong solutions, to the formation of some soluble sodium silicate. It is stated that when operated on a commercial scale the heat consumption is 260 Kg. cals per kilogram of caustic soda.

Hydrofluoric Acid

The ability of hydrofluoric acid to etch glass and other siliceous materials is the basis upon which the commercial applications of the acid rest. As early as the seventeenth century Schwanhardt demonstrated the action of the acid on glass at Nuremburg, but our first real knowledge of the substance was due to Scheele who pointed out that this peculiar acid was combined with lime in the mineral fluorspar. Gore in 1868 isolated pure hydrofluoric acid. The commercial acid is prepared by the distillation of powdered calcium fluoride with sulphuric acid; thick lead apparatus is used and the acid is absorbed in water.

The strongest commercial acid contains about 65 per cent. of the hydrofluoric acid, and may be used for the preparation of nearly all the other commercial fluorine compounds. It has been stated that the pure concentrated acid (60-70 per cent. strength) can be transported in steel drums, but this is not the common practice, rubber composition bottles holding 10 lb. of the strong acid being the main method of transport. Lead bottles may also be used. Fluorides can be transported in the usual way in kegs or drums.

Both the acid and the acid fluorides are used for etching on glass. The preparation of the acid is a comparatively simple operation on a technical scale, but care must be taken that no silica is present in the fluorspar used, since this leads to hydrofluosilica acid H_2SiF_6 in the product, while a more serious contingency is due to the fact that lead silico-fluoride is soluble, and the presence of silica in the raw material leads to serious corrosion of the vessels in which the acid is generated. Apart from the direct use of the acid on glass for etching purposes the glaze of certain types of Stourbridge ware is often treated with a little acid to give a matt surface with the simultaneous appearance of irridescence. Further uses of the acid comprise the manufacture of various glass cleaning preparations, especially those for the glass of railway carriages. Solutions containing a small amount of free hydrofluoric acid are very valuable for cleaning grime-encrusted glass. Paradoxically as it may seem, the surface of the glass is not affected, unless the acid concentration exceeds one per cent., but the dirt is very rapidly removed. The writer has for many years used such a solution for cleansing laboratory apparatus which has been used for essential and fatty oil analysis. Burettes, measuring cylinders, etc., which have been used for oil analysis invariably retain a minute trace of oily material, and although apparently clean and bright, become covered with adherent drops of solution when wetted which interfere considerably with subsequent measurements. This can be completely remedied by a rapid wash round with a warm solution containing 3 per cent. of hydrochloric acid and 1 per cent. of commercial sodium fluoride, followed by distilled water. An additional use of hydrofluoric acid is for the pickling of ferrous metal castings.

The Metallic Fluorides

Sodium fluoride is used for the preparation of certain casein cements (cold glue) and also in considerable quantities as a preservative of timber. It has been shown to have a greater penetrating power than either creosote or zinc chloride solutions, which are also favoured for the same purpose. It is also used for the precipitation of calcium and magnesium salts from impure water, that is, as a water softener. The acid fluoride $HNaF_2$ is used as a frosting agent, but does not give such soft effects as the corresponding salts of potassium or ammonium.

Acid sodium fluoride is the basis of several preparations for the removal of "iron-mould" as it exerts a rapid solvent action, without damaging the textile fibres; needless to say, it must be well washed off as soon as the solvent action has been achieved. The acid potassium fluoride is valued as a medium for the production of soft-toned frosted effects on glass bulbs.

Acid ammonium fluoride as a commercial article is usually known as ammonium bifluoride. It forms a concentrated solution used for frosting glass, but its more important application is in the fermentation industry. There is always experienced considerable difficulty, in fermentation processes depending upon the activity of yeasts, of keeping the desired organism in a "pure" condition. The medium in which the useful organism is growing is usually eminently suitable for the growth of other organisms, and the chance of aerial contamination is considerable. It has been found, however, that yeasts, as a general rule, are not susceptible to ammonium bifluoride in dilute solutions, but that the contaminating organisms are inhibited. This applies to acetic, lactic and butyric acid producing organisms. A small quantity of ammonium bifluoride, is therefore added to yeast washes in order to achieve this purpose. The success which has attended the

use of ammonium bifluoride in this way led to the general use of the compound as an antiseptic or preservative in breweries but is now discontinued.

Sodium antimony fluoride ($SbF_3.NaF$), known as "fluoremetic," is used as a mordant in dyeing; cerium fluoride is used in the preparation of pencils for arc-lamps, the light from which has considerable fog-penetrating power; chromium fluoride ($Cr_2F_6.8H_2O$) is used as a mordant in logwood dyeing and has a tendency to "green" after washing; whilst cupric fluoride (CuF_2) has been proposed as an oxidant in aniline black printing, but appears to have no obvious advantage over the more usual compounds.

Silico-Fluorides

Sodium silico-fluoride, prepared in the manner indicated above, finds a use as a substitute for cryolite in the preparation of fire-enamels, and also as a preservative for rubber-latex. In the latter case it is important to note that it has no effect on subsequent vulcanisation of the latex. A certain amount of sodium silico-fluoride is used as an insecticide, but the normal sodium fluoride is more valuable in this respect; normal sodium fluoride has met with considerable success in timber preservation, and in the prepartion of poisons for the extermination of roaches and chicken lice; aluminium fluoride, mixed with nine parts of quicklime has been suggested as a substitute for lead arsenate in the aerial campaign against the Mexican bean beetle, and the cotton weevil.

Zinc silico-fluoride finds use in France for the preservation of stonework, and as a general preservative. It is somewhat remarkable to notice that the zinc silico-fluoride has a high Rideal-Walker value as an antiseptic. It is, however, unsuited to medicinal work. One or two organic fluorine compounds, such as fluor-ψ-cumidine, and 4: 4'-difluoro diphenyl have been suggested as products of medicinal value, but at the present moment there is no organic fluorine derivative in use medicinally.

British Standards Institution

Grant of Royal Charter

DURING recent years the British Engineering Standards Association has prepared British Standard Specifications and established British Standards not only for use in the engineering field, but also for a growing range of materials in the building, chemical and textile industries. The need for regularising this extension of the original functions of the Association has therefore been under consideration from time to time, and became imperative when the chemical industry, as a result of a fully representative conference convened by the Association of British Chemical Manufacturers, invited the Association to widen its scope to include chemical standardisation generally.

At the Imperial Conference held in October, 1930, the desire was expressed that there should be a single centralised national standardising body in each of the countries forming the British Empire. It was therefore decided to re-organise the work of the Association into four main divisions of equal standing, responsible for the preparation of British Standard Specifications in the engineering, chemical, building and textile industries, each of the divisions being under the control of a representative divisional council. After securing the approval of the members of the Association, the Council applied for, and have now been granted a Supplemental Royal Charter, authorising these changes. In future the name of the Association will therefore be the "British Standards Institution" and its activities will be under the control of a General Council which will have under it the four Divisional Councils.

The great development which has taken place in the standardising movement since the first Committee was set up by the Institution of Civil Engineers in 1901 as the Engineering Standards Committee, is a clear indication that industry as a whole has increasingly recognised the economic value of this work. There are now 600 Committees and over 400 published British Standard Specifications. The Institution, however, is not a profit-making concern and apart from the grants received from the Government and the amount derived from the sale of its publications, it has to look to associated industries for the funds necessary to carry on its work, every British firm in the interested industries being eligible to become a member of the Institution at a nominal fee.

Developments in Synthetic Rubber

A New Product of the Du Pont Co.

AT a meeting of the Akron group of the Rubber Division, American Chemical Society, which was held in Akron on November 2, chemists of the du Pont Co. announced the results of extensive investigations that had led to the development of a new synthetic rubber made by the controlled polymerization of chloroprene—that is, 2-chloro-1,3-butadiene. The du Pont Co. also announced that a plant is being constructed for the manufacture from chloroprene of the new synthetic rubber to which the trade name "Duprene" has been applied. The papers read at the Akron meeting appear in the November issue of the *Journal of the American Chemical Society*. They reveal that chloroprene is made by the addition of hydrogen chloride to monovinylacetylene which is, in turn, made by the catalytic polymerization of acetylene. It follows that all of the raw materials required for the manufacture of the new synthetic rubber are available in almost unlimited quantities.

The many efforts that have been made to produce synthetic rubber have been due in part to the outstanding importance of rubber synthesis as a scientific problem, to the limitations of natural rubber which greatly restrict its use, and to the desire of every country to have a domestic source which cannot be cut off in time of war. It is, therefore, a matter of industrial interest that a commercially practicable method has been found for the manufacture of a synthetic rubber claimed to be superior to natural rubber in some respects and which would, in the event of national emergency, be a quite satisfactory substitute for natural rubber for many of its present uses.

Vulcanisation Effected without Sulphur

Although chloroprene differs chemically from isoprene only in that a chlorine atom replaces the methyl group, it polymerizes spontaneously at many times greater velocity than isoprene and the resultant product is a fully vulcanised rubber having properties similar in a general way to the products obtained by vulcanising natural rubber with sulphur. It is neither necessary nor desirable to add sulphur in order to produce a fully vulcanised rubber from chloroprene. In addition, it has also been found possible to stop the polymerization at an intermediate point, thereby obtaining a plastic polymer which has the general properties of unvulcanised rubber. This material may be compounded with fillers, diluents, etc., the same as natural unvulcanised rubber. The polymerization or vulcanisation can then be completed merely by heating it for a short time at a moderate temperature of 110° to 130°C., whereas natural rubber and all previously known synthetic rubbers require the addition of sulphur chloride, sulphur, or a related element in some form in order to effect vulcanisation.

Compared with natural rubber this new synthetic rubber is more dense, more resistant to water adsorption or penetration by water, less strongly swelled by petroleum hydrocarbons and most other solvents, and less permeable to many gases. It is much more resistant to attack by ozone, oxygen, and other chemicals. It is said to be highly resilient, which is presumably partly due to its freedom from the impurities found in natural rubber. It does not soften under the influence of heat but hardens slowly when heated at high temperatures. Consequently, the methods used for reclaiming vulcanised natural rubber are not applicable to chloroprene rubber. Acidic materials, which retard the polymerization of natural rubber, do not have this effect on the chloroprene plastic polymer, as since the latter contains no sulphur, it does not tarnish metals.

Chemical Trade of the Netherlands

DURING the first six months of 1931 the total chemical trade of the Netherlands was 156,733,000 florins, of which 88,093,000 represented imports and 66,640,000 exports. These figures compare with a total trade of 220,008,239 florins, of which 117,176,208 were imports and 102,832,031 exports for the first six months of 1930. The Netherlands carried on an important foreign trade in chemical products including medicines, paints and dyestuffs but of greater importance both in quantity and value is the movement of oils, resins, waxes, pitches, tars and distillates of tars.

A Safe-Packing for Chemicals

Guelph Patent Cask Co. Ltd.

IN the chemical industries packing is worthy of especial interest, for, in addition to the possibility of container breakages during transit, the vagaries of our English climate have to be contended with. The results to chemicals exposed to damp need no stressing, and on this point alone, dissatisfied customers, by quickly finding an alternative source of supply, will prove conclusively that the saving of half-pence in packing is a false economy. Contrarily, this means that really satisfactory packing can be looked upon as an aid to those increased sales for which go-ahead concerns strive.

Faulty packages are familiar objects to persons engaged in receiving chemicals and other goods. The once "nice looking" container has become a sorry sight through the rough handling incurred in transit, and, when received, is no credit to the company that despatched it. A combination of strength, service, lightness and appearance should be aimed at; but strength and service, being the vital factors that ensure satisfaction, must take precedence. Many points have to be taken into consideration when deciding what actually is a satisfactory package. For instance, a product being delivered direct from factory to consumer by lorry gets no intermediate unloading and re-loading, and, therefore, need not be as sturdy as a similar product being despatched by rail. For export abroad, on the other hand, additional strength would be required to counteract the extra handling and transport whilst extraordinary strength may be necessary for the same product if despatched to those parts of the East where methods of porterage are still somewhat primitive.

It is therefore opportune to mention in this connection the products of The Guelph Patent Cask Co., Ltd. This company has for the past 50 years satisfactorily supplied the wants of the chemical and allied industries. In spite of the trade depression of recent times, the demand for Guelph casks has risen appreciably year by year, and no better recommendation for their use than this can be put forward. The company manufactures a range of over 600 sizes, each of which can be plain, or lined with card, water-proof paper, tin-plate or zinc; bags of grease-proof paper can also be supplied if required. The head office of the Guelph Patent Cask Co., Ltd., is at West Ferry Road, Millwall, London.

Aluminium in Road Tank Construction

Aluminium Plant and Vessel Co., Ltd.

A BULK transport tank to a new patented design was exhibited by the Aluminium Plant and Vessel Co., Ltd., of Wandsworth, at the Exhibition of British Chemical Plant which was held in London in July last. Here the principle was applied of mounting the tank flexibly on the chassis by means of elastic bearings, which have given excellent service in many other directions. By these means a lighter tank and mounting are made possible, for when the utmost rigidity has been sought, very heavy mountings, iron bearers and cradles have been necessary. For tanks where internal fittings must be avoided, as in the case of milk and beer, this aluminium tank was fitted with external steel bands carrying specially designed supporting blocks which are bolted to the chassis through flexible mountings, and in insulated tanks these bands are concealed by the outer casing. Where internal supports are not objectionable, however, as in the transport of petrol, oils and acids, the load is transmitted by welding in a hollow strut carrying a pad which is bolted to the chassis through flexible mountings. This principle of construction has been found to give smooth running over the worst road surfaces even when the tank is only partly filled.

The economy of aluminium tanks may be appreciated from the following facts. An aluminium tank generally weighs rather less than half a steel tank. Taken at its lowest this means lower petrol consumption, increased life of tyres, and a reduction in wear and tear on the chassis. For example, with a total permissible load on a given chassis of three tons for both tank and contents, it is possible to get a 20 per cent greater useful load with an aluminium than with a steel tank. In other cases where the maximum useful load is already being carried, a smaller or lower priced chassis can be used with a reduction in first cost and greatly diminished running expenses. For example, with a four-compartment transport tank holding five tons of petrol, the reduction in weight by using aluminium in place of steel, permits a saving of £200 in chassis price.

Birmal Chemical Engineers

A second exhibit of this nature was staged by Birmal Chemical Engineers, who had a tank constructed throughout in welded Birmabright alloy sheet, which, complete with fittings, only weighed 225 lb., compared with 600 lb. for a mild steel tank of identical capacity (300 gallons). This tank was of smooth interior finish, provided with inlet connection, suction outlet, bottom drain, manhole and lid, and level gauges, all fittings being made in Birmabright alloy.

The Conveying of Air or Gases

W. C. Holmes and Co., Ltd.

IN the conveying of air or gases from one part of a works to another, there are many points which call for consideration before a final decision can be made. For instance, the pressure at which the gas has to be delivered and the size of pipes to be run, upon which depends the initial pressure and consequently the cost of transmission due to the power requirements.

In Holmes-Connersville machines, the air or gas is moved at low velocities through free inlet and discharge openings, for pressure or suction is dependent on the positive mechanical action of the impellers, rather than the creation of high velocities, consequently, the fluid or surface friction is inconsiderable. In the second place, since the internal rotating parts are arranged to fit in the casing with only a few thousandths of an inch clearance, and consequently do not have wide open clearance spaces, the loss due to leakage past the impellers is small, giving them a relatively high volumetric efficiency. Because of these characteristics, the Holmes-Connersville machines are economical in power consumption when working within their specified range of capacities and pressures. There is no internal contact, and consequently no internal lubrication is required, and on the other hand, as the clearances are small, no internal sealing or filming is required, in order to give high efficiency; in consequence, the product to be handled is as pure on the discharge side as it was before entering the machine.

Some Refinements in Pump Design

Sulzer Bros.

CENTRIFUGAL pumps made of Thermisilid (a silicon alloy) suitable for dealing with acetic acid, lactic acid, bromine, lyes, chlorates, chlorides, phosphoric acid, chromic acid, formic acid, sulphuric acid, green vitriol, etc., are a speciality of Sulzer Bros., 31 Bedford Square, London, W.C.1. In these pumps the casing, cover and impeller are made of Thermisilid, and the shaft is of special steel, protected by a sleeve of Thermisilid, carried in a strong ring-lubricated pedestal bearing with thrust bearing incorporated. The stuffing box can be adapted to comply with special requirements, and in cases where the liquid flows into the pump under pressure any liquid issuing from the pressure chamber into the stuffing box is returned to the suction side through a special passage in the casing, by means of an auxiliary pump fitted in the stuffing box space. The possibility of leakage is thereby reduced to a minimum. Another speciality of Sulzer Bros. is the use of stainless steel in the construction of centrifugal pumps for dealing with ammonium chloride solution, sulphurous acid, hydrogen peroxide, weak hydrochloric acid, nitric acid, etc. In these pumps the casing, cover, impeller and shaft, and all parts in contact with the liquid to be pumped are made of chrome steel or materials of similar composition. The stuffing box can be adapted to suit various requirements depending upon the nature of the liquid to be pumped, and arranged with cooling water jackets when hot liquids have to be dealt with.

Netherlands Paint and Varnish Industry

TRADE estimates place the number of firms manufacturing paint and varnish in the Netherlands at over 150, the majority of which comprise small to medium size plants. No figures are available indicating the domestic output of paint products, but production is considered in excess of domestic consumption.

The Better Utilisation of Coal

Discussion at the Pittsburgh Conference

THE production of a marketable fuel oil from coal was discussed by Professor R. V. Wheeler, of the Department of Fuel Technology, Sheffield University, in a paper read at the Third International Conference on Bituminous Coal, held at Pittsburgh last week. Professor Wheeler said that Britain's coal exports had consistently declined since 1913, and she annually imported 2,405,000,000 gallons of mineral oil, this statement being based on figures for 1930. A successful method of low temperature carbonisation would restore prosperity to mining areas enable manufacturers to compete on better terms with their foreign rivals, preclude the need of buying fuel oil from overseas for use in the ships of the Royal Navy, and end our complete reliance on other countries for supplies of oil fuel.

Referring to the low temperature carbonisation of coal, Professor Wheeler said that the system devised by Commendatore Piero Salerni was a variation of a process with which the Department of Fuel Technology in Sheffield University had been experimenting for the last four years. Without impairing the thermal efficiency or the character of the products yielded by the original system, Salerni had succeeded in increasing the density of the semi-coke by 25 to 30 per cent., and so made it a satisfactory substitute for bituminous coal for general purposes. The calorific value of the coke was also increased, while the process removed the causes of trouble hitherto experienced in the refining of low-temperature oils. Mechanical difficulties of plant had also been overcome, and all caking bituminous coals could be treated without any alteration to the plant and without the blending of coals of different origins. The coke produced was in the form of spheroidal lumps of suitable size easy to handle and transport, and the oils to be refined were rich and free from dust and pitchy constituents.

Sir Richard Redmayne's Views

Sir Richard Redmayne, formerly Chief Inspector of Mines, in a paper which he had prepared for the Conference, said Great Britain held premier place in coal exports, but she had in recent years suffered a heavy decline. In 1913 Great Britain exported 50.5 per cent. of the world's coal needs, in 1930 only 39.5 per cent. The first nine months of 1931 compared with the same period of 1930 showed a decrease in coal exports of over 10,000,000 tons. The most promising method of ensuring a greater national use of coal was low-temperature distillation, by that means two products of immediate commercial value, smokeless fuel and crude oil, were produced. The development of the process had reached a stage at which the operating costs and working results could be determined with accuracy since large-scale working had now been carried out. Smokeless "semi-coke" fuel was eminently suitable for burning in domestic hearths, and he thought it should be possible to sell this fuel at a price to compete with coal. The household consumption of coal in Great Britain was now about 40,000,000 tons a year. If this coal were replaced by the semi-coke resulting from the low-temperature distillation process an additional 13,000,000 tons of coal would need to be produced each year. If, then, all towns in Great Britain of a population of, say, over 500,000, were required to use, after a certain date, smokeless fuel (anthracite or semi-coke or gas), as in the United States, smaller towns would follow until gradually raw coal would cease to be consumed in the domestic hearth. In that way a great impetus would be given to the low-temperature carbonisation industry and, owing to the greatly enhanced output of coal, unemployment among miners would be decreased, a new industry would be created the demand for steel would be expanded by the construction of new works, and a greater use would be made of home-made liquid fuel as opposed to imported foreign oil. A means would also have been found for using the surplus products of British collieries.

New Facilities for Speeding-Up Air Mails

IT has now become possible so to expedite air-mail transport between London and Paris that from the time of posting in London, to the actual delivery in Paris, the total time occupied—including ground connections as well as the aerial journey from Croydon to Le Bourget—is only a little over five hours. Three-quarters-of-an-hour are saved by the establishment of a new sub-post office at the Airway Terminus of Imperial Airways, adjoining Victoria Railway Station, London, S.W.1. Hitherto, late letters intended for the air-mail to Paris which leaves the London air-port at 12.30 p.m. daily have been accepted at the General Post Office, London, up to 11 a.m., after which they have had to be placed in bags and sent to the Airway Terminus at Victoria to catch the passenger-car for the Croydon air-port which leaves at 11.45 a.m. With the new sub-post office now at the Airway Terminus it becomes possible to post a late letter at this office up to within a minute of the departure of the car for Croydon.

The Superphosphate Industry

Preliminary Statistics for 1930

ACCORDING to statistics which have just been published by the International Superphosphate Manufacturers' Association, it would appear that production of superphosphate during the calendar year 1930 was not less than 14,550,000 tons, as compared with 15,313,516 tons in 1929, a decrease of about 763,500 tons, or say nearly 5 per cent., which, having regard to the general economic crisis and to the specially difficult position of agriculture, must be deemed a very favourable result. Unfortunately consumption, so far as it may be established from available statistics, was not nearly so favourable. In the twenty-three countries forming the ordinary members of the Association, the consumption in 1930 was only 7,832,279 tons, as compared with 9,043,944 tons in 1929, a decrease of 1,211,665 tons, or nearly 13.4 per cent., a very heavy fall which is not to any extent offset as to tonnage by increases in other countries of the world, although the results in other countries reduce the percentage fall in consumption. A preliminary estimate of the total world consumption in 1930 gives approximately 14,025,000 tons used as compared with 15,465,000 tons in 1929, a reduction of 1,440,900 tons or 9.3 per cent.

As world consumption exceeded world production in 1929, stocks were reduced by nearly 152,000 tons, but in 1930 production exceeded consumption by 525,000 tons; hence stocks were increased to that extent. Full details of the completed statistics will be published as soon as they are available.

Fuel Research at Sheffield University

IN the annual report of the Council to the Court of Governors of Sheffield University it is stated that the financial position of the University, while certainly better than it was a year ago, still gives cause for some anxiety. Of the additional grant of £8,000 per annum, assigned this year to the University by the Treasury Grants Committee, about £4,000 had been allocated to the purposes specially indicated as desirable in the report of the Committee, namely, the increase in the salaries of teachers and the improvement of the library. In the Department of Fuel Technology, much research had been carried on with reference to the production and properties of metallurgical coke (with financial assistance from the Midland Coke Research Committee), the constitution of coal and the low temperature carbonisation of coal (both by means of generous grants from the Department of Scientific and Industrial Research), and the pyrolusis of hydrocarbons and the characteristics of explosions of motor fuels (both by means of grants from the Anglo-Persian Oil Co.), and much work had been done in the investigation of smoke abatement by arrangement with the Sheffield Smoke Abatement Committee.

Sodium Sulphate Deposits in Canada

A NEW mineral industry, reported to be the fifth of its kind in Saskatchewan, is opening up at Whiteshore Lake, near Biggar, where one of the largest sodium sulphate deposits in the province is to be exploited. The deposit in the bed of Whitehead lake is estimated at nearly 20,000,000 tons, and present plans for development are those of the Whiteshore Lake Salts and Chemical Co. The company is erecting a plant which is expected to be in operation before the end of the year. The salts taken from the lake bed will be subjected to an evaporating or drying process to produce anhydrous salts for shipment.

Chemical Matters in Parliament

The Dyestuffs Act

IN the House of Commons, on Monday, November 23, Major Attlee (Limehouse, Lab.) moved an amendment to strike out of Expiring Laws Continuance Bill the Dyestuffs (Import Regulation) Act. Last year, he reminded the House, there was a very close division on a similar amendment, the chief protagonists against the continuance of the Act being Sir Herbert Samuel and the then Chancellor of the Exchequer (Mr. Snowden). He complained that there was no provision in the Act for a complete control over the dye industry in this country to ensure that it was carried on with the greatest possible efficiency, and that it did not take undue advantage of its sheltered position. The Labour party was neither for Protection nor Free Trade. They believed that industry had got to be organised, and that importation had got to be controlled, but they would not be satisfied unless the State got full advantage for itself and the people of this country of the benefits which accrued, and unless full consideration was given to the interests of consumers and of the workpeople.

Mr. Ramsden (Bradford, C.), speaking on behalf of the Yorkshire woollen manufacturers, claimed that the Act had been of great benefit in promoting the manufacture of dyestuffs. The production of dyestuffs in this country had grown from 9,114,130 lb. weight in 1913 to 20,802,563 lb. in 1922, the first year of the operation of the Act, and 42,590,243 lb. in 1930. Exports had also increased. British manufacturers were now able to compete on equal terms so far as a large quantity of imported goods was concerned.

Mr. Hore-Belisha (Parliamentary Secretary to the Board of Trade) maintained that the textile trade was getting all the dyes it required. The very fact that more licences had been given demonstrated quite clearly that the textile trade was not being put to any privation. The result of the working of the Act was that, whereas before the war we had a dyestuffs industry of mean proportions, we were now providing over 90 per cent. of our own requirements. It would be a very sad thing if, when the Government was taking conscious control of our imports in other directions, we were to abandon our control of this particular commodity.

The amendment, at this point, was not pressed.

The Newcastle Chemical Industry Club

A USEFUL calendar of the technical and scientific meetings to be held in the Newcastle District during the Winter Session 1931-32 has been issued by the Newcastle Chemical Industry Club, incorporating the addresses of the secretaries of some twenty-five local societies. Established in 1919, this Club occupies a comfortable house at 5 Lovaine Row, Newcastle-upon-Tyne, close to Armstrong College and the Hancock Museum, and aims to provide a meeting ground for those interested in chemistry and industry. In addition to general club rooms, the premises contain a library of technical books and periodicals, a billiard room, and a bedroom available at reasonable terms. The Club employs a resident steward and light refreshments can be obtained. During the winter, informal lectures are given on technical and general subjects, while in the summer, visits are made to places of special interest in the neighbourhood. Prospective members are invited to communicate with the hon. secretary, Norman Dawson and make an appointment to inspect the club.

Organic Compounds of Gold

IN the *Journal of the Chemical Society* for September, Gibson and Coller describe the preparation of compounds of gold tribromide with substances such as pyridine, quinoline and isoquinoline. The substance previously used in such work and considered to be gold tribromide is shown to be hydrated bromoauric acid, probably $HAuBr_4.3H_2O$. The methods of preparation of this substance and of pure gold tribromide, which is almost insoluble in ether and is regarded as $(AuBr_3)_2$ with the gold having a co-ordination number of 4 and not truly tervalent, are described in detail. Although the new co-ordination compounds were expected to be soluble in ether and hence suitable for use with the Grignard reagent, they were generally sparingly soluble, although the Grignard reaction could be carried out and diethyl gold bromide obtained.

Perforated Metal and Woven Wire

G. A. Harvey and Co. (London) Ltd.

AT the works of G. A. Harvey & Co. (London), Ltd., Woolwich Road, London, S.E.7, which cover an area of twenty-five acres, there is an extensive plant for the production of sheet metal and steel plate work up to 1½ inches in thickness. This firm are the largest manufacturers of perforated metal and woven wire cloth in the United Kingdom. Such metals are indispensable for the straining and the gravitational or centrifugal filtration of a number of products, as, for instance, chemicals, oils, varnishes, fruit juices and syrups, as well as for the screening and grading, cleaning or sifting of commodities as coal, coke, ore, sand, gravel, cement, food products, cereals and chemicals in powder form. There is scarcely a metal which the firm of Harvey are not prepared to perforate or weave into wire cloth to any specification, including steel, nickel, stainless steel, copper, bronze, brass, monel metal, aluminium, delta metal, duralumin and zinc. They manufacture woven wire cloth with a fineness of 520 mesh, which, we believe, is the world's record for the manufacture of metallic woven wire and, equally remarkable, perforated sheets with apertures of .015 in. diameter, (.3810 m.m.) giving 610 holes to the square inch.

A speciality of G. A. Harvey and Co. is the perforating of copper sheets with elongated conical slots for centrifugal machines used in the sugar industry. Until a few years ago, these centrifugal linings could only be obtained in Germany, but Harvey's succeeded in solving the problems involved, and are now the only firm in England making perforated linings of this type.

Transporting Gases Under Pressure

Developments in the United States

RAPID development in the commercial introduction of new chemicals is causing rapid changes in modes of transportation. The General American Tank Car Co. has constructed a new high-pressure tank car suitable for the handling of butane and similar products, and certain peculiarities about the application of the insulation of cork is of special interest The cork blocks used are the total thickness of the insulation. That is, for insulation 4 inch thick, the blocks are 4 inches thick. This is a very distinct advantage over the usual application of insulation, wherein a 4 inch thickness is made up of either four 1 inch blocks or two 2 inch blocks. In either of the latter methods of application cork is rubbing on to cork and inasmuch as the various layers are merely stapled together, there is a very definite movement when the car is in use, which quickly pulverises the cork and greatly deteriorates the insulation. With this method of application the cork is held firmly between the metal of the tank and the metal jacket, and retains its form indefinitely. The cork is strapped on to the tank with bands drawn tight and held tight by special buckles. This is quite different from the usual method of application which consists of merely holding the cork in place by wire and depending on the metal jacket to properly retain it in place.

Facilities Offered by the Slough Trading Estate

THE factories on the Slough Trading Estate are let on lease at moderate rental. The company can tell the prospective tenant the exact yearly inclusive cost of the factory or site, including the required amount of electric power and other supplies. Those who desire to erect their own factory can be offered a selection of some of the best sites round London, fully developed on long lease at a nominal rent, so enabling the cost of buying land outright at a fancy price to be avoided. The Slough Trading Estate is already accommodating many famous industries. The estate is well worth a visit for here the visitor can see other manufacturers who have taken advantage of the facilities offered, and hear their opinions of this remarkable undertaking which has given such a spurt to industry. The advantages of walking straight into a first-class factory and starting business just as soon as the necessary plant is installed, must appeal to all progressive concerns. The site is only twenty-two miles from London—less than an hour's run by car or 25 minutes by train.

From Week to Week

THE NORTH BRITISH RUBBER CO. is to reconstruct its devulcanising department at their Castle Mills, Edinburgh.

MAJOR A. B. SHEARER, of Coventry, gave a lantern lecture to members of the Birmingham and Midland Institute Scientific Society on "The Invention and Development of Rayon," on Wednesday, November 18.

RUMOUR IS CURRENT in the district that a well-known concern has made an offer for the Eastriggs section of Gretna Munitions Factory which includes the building formerly used for the manufacture of glycerine.

THE PERKIN MEDAL of the American Chemical Society for 1932 has been awarded to Dr. Charles F. Burgess, of the Burgess Laboratories, Madison, Wis., for his achievements in electrochemistry. The medal will be presented at a meeting of the Society, in New York, on January 8.

ONE MAN WAS KILLED and two seriously injured when molten metal poured over them through an explosion in the works of Galvanisers, Ltd., Fore Street, Whiteinch, Glasgow, last week. The dead man is Robert Gray, and the injured are James Longwell and John Paton, all of Glasgow.

A FIERCE FIRE, which threatened to destroy the Holt Secondary School, Liverpool, on Friday, November 20, was subdued after a sharp fight by detachments of the Liverpool Fire Brigade, and confined to the precincts of the chemical laboratory, in which it originated.

ACCORDING TO A MESSAGE FROM MOSCOW the first section of the gigantic metallurgical plants which are being constructed at Magnitogorsk, in the Ural Mountains, and Kuznetzk, in Siberia, have now been completed. Construction was begun in June, 1930. The first of the four blast-furnaces, which will have a capacity of 3,500 tons of cast-iron per day, has been put into operation. The total capacity of these plants will be 3,700,000 tons of cast-iron a year.

MEDICAL EXPERTS in Liverpool are investigating the death, a week ago, of two labourers employed at a Bootle tin smelting work. Thomas Lowe and James Parry, the dead men, and their four mates were all equipped with respirators as protection against noxious fumes, but they were seized suddenly with violent pains and collapsed. They were immediately removed to hospital, where Lowe lost consciousness and died within thirty-six hours. Parry died after showing symptoms of arsenical poisoning.

RECENT WILLS include:—Sir Thomas Paul Latham, Bart., of Crow Clump, Weybridge, Surrey, for many years joint managing director and for a period Deputy Chairman of Courtaulds, Ltd., £764,049 (net personalty £764,049). Mr. Robert MacNeil Buchanan, M.B., C.M., of Scotstounhill, Glasgow, first city bacteriologist of Glasgow, formerly lecturer on bacteriology in the University of Glasgow, £4,175. Mr. John Wyld, of Myholme, Broadway, Morecambe and Heysham, Lancs, at one time a manager and a director of Brotherton and Co., Ltd., £14,615 (net personalty £14,555). Mr. Joseph Olivar, of Kingston-upon-Hull, director of Lofthouse and Saltmer, Ltd., manufacturing chemists, £8,547 (net personalty £8,142).

The ANGLO-PERSIAN OIL CO., have announced that they are about to make to the holders of the 7 per cent. Non-Cumulative Participating Preference shares of Scottish Oils, Ltd., an offer to acquire their shares cum all dividends not already declared and paid in exchange for 9 per cent. Cumulative second Preference shares of the Anglo-Persian Co., ranking for dividend as from April 1 last, at the rate of two Anglo-Persian for three Scottish Oils shares. A similar offer will be made to the holders of the Preference shares of the Pumpherston Oil Co., Ltd., the Broxburn Oil Co., Ltd., and the Oakbank Oil Co., Ltd., but in these cases the shares to be issued in exchange will be the 8 per cent. Cumulative First Preference shares of the Anglo-Persian Co. Scottish Oils, which is already controlled by the Anglo-Persian Co. through its holding of the Ordinary shares, owns all the Ordinary shares of the Pumpherston, Broxburn, James Ross & Co., Philipstoun, and the Oakbank Oil Companies, and practically all the shares in Young's Paraffin Light & Mineral Oil Co.

A DISPUTE HAS ARISEN between the employees and Culler and Sons, Perth, as a result of the proposal to ask employees to lie off work one week in three. As a result of meetings, however, an amicable settlement is expected.

THE BRITISH ENGINEERING Standards Association is now styled the British Standards Institution. Its address remains 28 Victoria Street, Westminster, S.W.1 (telephone: Victoria 3127), but the new telegraphic address is "Standards, Sowest, London."

A COMPRESSED AIR TANK in the chemical works of Richard Smith's Executors, Ltd., tar distillers, West Street, Glasgow, exploded on Friday, November 20, and a workman was so severely injured by flying metal that he died on his way to the Infirmary. The victim was Joseph Orr (40), of Southside.

THE IRISH FREE STATE GOVERNMENT have decided to accept the offer of a donation from the Rockfeller Foundation for the building of a State Laboratory and plans will be considered immediately. At the present time the pathological laboratories of the Universities are being used for State Laboratory work.

THE SECRETARY FOR MINES announces that the following low density explosives have passed the prescribed tests for inclusion in the list of "permitted explosives": Antislak (manufactured by Cooke's Explosives, Ltd.), Eversoft L. D. Powder (manufactured by Explosives and Chemical Products, Ltd.), Rounkol and Rounkol No. 2 (manufactured by Nobel's Explosives Co., Ltd.).

SIR HOLBERRY MENSFORTH has joined the boards of John Brown and Co., Sheffield and Clydebank, and of Thos. Firth and John Brown, Ltd., Sheffield. Sir Holberry is a vice-president of the British Electrical and Allied Manufacturers' Association, chairman of the English Electric Co., Ltd., and a director of Darlington Rolling Mills, Co., Ltd., and Dorman Long and Co., Ltd.

IN CONNECTION WITH THE CENTENARY of the invention of the safety fuse by William Bickford Smith, the members of the Cornish Institute of Engineers met at Camborne on Saturday, November 21, and paid a visit of inspection to the Tuckingmill fuse factory of Bickford Smith and Co. In the evening the members, associates and subscribers assembled at the School of Mines, Camborne, under the presidency of Mr. Henry Bailey, when Dr. W. Cullen gave a lantern lecture on William Bickford.

ACCORDING to the returns given in the *Ministry of Labour Gazette* for November, 16,952 persons were registered as wholly unemployed on October 26 in respect of the chemical industry in Great Britain and Northern Ireland; an additional 1,530 persons were affected by temporary stoppages. These figures do not include persons engaged in the manufacture of explosives (2,264 wholly unemployed, 508 temporary stoppages); paint, varnish, red and white leads (2,142 wholly unemployed, 236 temporary stoppages); and oil, glue, soap, ink and matches (8,650 wholly unemployed, 1,448 temporary stoppages).

AT THE FORTHCOMING MEETING of the Society of Public Analysts, to be held at the Chemical Society's Rooms, Burlington House, Piccadilly, W.1., on Wednesday, December 2, at 8 p.m., papers will be read by H. W. Buston, on a Micro-method for the Determination of Uronic Anhydride Groups in Pectic Substances; by N. E. Cocchinaras, on the Composition of Linseed Oil; by T. Hedley Barry, on Oil from Malayan *Meurites Montana* and the Properties of Hong Kong Oil, and by S. G. Clarke and W. N. Bradshaw, on the Calcium Fluoride Method for the Determination of Fluoride, with Special Reference to the Analysis of Nickel Plating Solutions.

Obituary

SAMUEL STEWART, F.I.C., of Kirkcaldy, November 18.

DR. JOHN BALDWIN SHOESMITH, for 10 years lecturer in the Chemistry Department of Edinburgh University, aged 35.

MR. JOHN J. KERMODE, a pioneer in developing the use of oil fuel in ships, well known as a consulting engineer in Liverpool for thirty years. Aged 72.

MR. J. WILLOUGHBY HASLUCK, of the Aston Chemical and Insulating Co., Birmingham.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

353,688. ACETIC ANHYDRIDE. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, August 1, 1929.

Acetic anhydride is obtained by passing acetic acid vapour through molten phosphates which are heated by the passage of an electric current between the tube admitting the vapour and the crucible containing the catalyst. In an example, a copper tube and copper crucible are used with a melt of sodium and lithium meta-phosphates at 640° C., and in another example Krupp's V4A chromium-nickel steel is used with sodium and lithium meta-phosphates and boron phosphate.

353,932. DYES. A. G. Bloxam, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, April 24, 1930.

A leuco derivative of an α-oxyanthraquinone or an α-oxy-amino-anthraquinone, or a sulphonic acid, or a derivative of these, is heated in aqueous solution or suspension, and in presence of boric acid, with ammonia or a primary aliphatic or araliphatic amine and the product oxidised if required. This reaction may be combined with the production of the leuco anthraquinone, and oxidation may be effected simultaneously with the condensation. In an example, sodium 1 : 5-dioxy-4 : 8-diamino-anthraquinone-2 : 6-disulphonate, hydrosulphite and boric acid are heated with aqueous ammonia to obtain 1-oxy-4 : 5 : 8-triamino-anthraquinone, which gives blue shades on acetate silk. Other examples are given.

354,198. ALIPHATIC ACIDS. H. Dreyfus, 22 Hanover Square, London. Application date, May 2, 1930.

Aqueous solutions of acetic, propionic and other aliphatic acids are treated with solvents containing at least one ether of a monohydric phenol, and the extract is fractionally distilled, or the vapour of the dilute acid may be passed in counter-current with the solvent through a fractionating column at a temperature at which water remains vaporised, or the two vapours may be mixed and cooled to condense out the acid alone. Suitable ethers include the methyl-, ethyl- and propyl-α-naphthol ethers, the methyl-, ethyl-, propyl-isopropyl-, and para-tolyl-β-naphthol ethers, the cresyl ether anisol, phenetol and phenyl ether.

354,199. ALIPHATIC ANHYDRIDES. H. Dreyfus, 22 Hanover Square, London. Application date, May 2, 1930. Addition to 279,916 (see THE CHEMICAL AGE, Vol. xvii, p. 535).

The vapour of acetic and other aliphatic acids is treated with a high-boiling solvent consisting of phenol ethers other than anisol and phenotol, *e.g.*, the methyl and ethyl ethers of α and β-naphthol, the paratyl, propyl, isopropyl, phenyl, and benzyl ethers of β-naphthol, the cresyl ethers of the cresols, and phenyl ether. The ether may be employed in a liquid or vapour form.

354,308. STYROL. Naugatuck Chemical Co., Elm Street, Naugatuck, Conn., U.S.A. (Assignees of O. H. Smith, 1287 Pennington Road, Englewood, N.J., U.S.A.) International Convention date, April 20, 1929.

Ethyl benzene and benzene are cracked in the presence of substances which favour dehydrogenation by forming stable compounds with the hydrogen produced or by reducing the partial pressure of the ethyl benzene, such as carbon disulphide, carbon tetrachloride, ethylene and sulphur which act chemically, nitrogen, ammonia, carbon dioxide, ethyl alcohol and acetone which act physically, or ethylene chloride, sulphur mono-chloride, sulphur dichloride and sulphur dioxide which act in both ways. The temperature of the reaction may be 675°-720° C., and styrol is separated from the mixture of benzene and by-products.

354,323. VAT DYES. S. Thornley, R. F. Thomson, J. Thomas and Scottish Dyes, Ltd., Earl's Road, Grangemouth. Application date, January 30, 1930.

Halogenated pyranthrones, flavanthrones, dibenzanthrones and isodibenzanthrones are partly or wholly dehalogenated by alkali metal alcoholates. Examples are given of the partial dehalogenation of 3 : 3¹-dichloroflavanthrones, brominated pyranthrones, pentachlordibenzanthrone, and dichloroiso-dibenzanthrone with sodium methylate, and the complete dehalogenation of 3 : 3¹ dichloroflavanthrone with sodium benzylate.

354,352. QUINOLINE DERIVATIVES. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 2, 1930.

An amino-alkyl group, which may be interrupted by nitrogen, oxygen or sulphur, is introduced into the amino group of 5 : 6-dialkoxy-8-aminoquinolines by treatment with esters of amino- or alkylamino-alkyl alcohols, or with derivatives such as halogenalkyl-phthalimides, the latter then being decomposed. An intermediate compound may be used as starting material, *e.g.*, 8-aminoquinolines which contain substituents in the 5- and/or 6-positions convertible into alkoxy groups, or 8-aminoquinoline or 5- or 6- alkoxy-8-aminoquinolines, the product after introduction of the aminoalkyl group being converted to the 5 : 6-dialkoxy compounds. A number of examples are given.

354,357. HYDROXYALKYL COMPOUNDS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 6, 1930.

Organic compounds containing reactive hydrogen atoms, *e.g.*, alcohols, phenols, carboxylic acids, or primary or secondary amines, are treated with alkylene oxides at 40°-200° C. in the presence of acidified hydrosilicates, to obtain hydroxyalkyl compounds. The catalyst is finally filtered off, and the product fractionally distilled. Examples are given of the production of ethylene glycol monoethyl and monomethyl ether, α-propylene glycol monoethyl ether, ethylene glycol monophenyl ether, dihydroxyethyl aniline, N-hydroxyethyl-butyl aniline, dihydroxy-ethyl para-aminophenol, tetra-hydroxy-ethyl benzidine, ethylene glycol monoisopropyl ether, ethylene glycol mono-2-butyl ether, ethylene glycol mono-2-chlorethyl ether, butylene glycol monoethyl ether.

354,388. ALDEHYDES AND KETONES. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 10, 1930. Addition to 331,185 (see THE CHEMICAL AGE, Vol. xxiii, p. 192.)

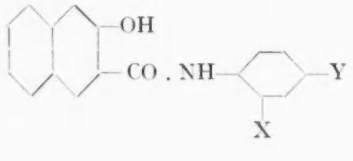
1 : 2-Alkylene oxides, which may be mixed with 2 : 3-oxides are passed over catalysts consisting of halides or oxyhalides of the alkaline earth metals, magnesium or beryllium which may be deposited on granular carriers or mixed with pumice meal, kieselguhr, etc. The reaction is effected at 200°-400° C. and pressures up to 50 atmospheres. In examples, propylene oxide is passed at 330°-350° C. over barium bromide, yielding propionaldehyde and acetone, propylene oxide vapour and nitrogen are passed at 300° C. over a mixture of magnesium oxychloride, magnesium ammonium phosphate and bleaching earth, yielding propionaldehyde and acetone, commercial butylene oxide is passed at 300° C. over a mixture of calcium fluoride, barium fluoride and kieselguhr, yielding iso-butyraldehyde and *n*-butyraldehyde, with methylethyl ketone and unsaturated aldehydes and alcohols.

354,392. DYE INTERMEDIATES. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 10, 1930.

Hydroxy-diphenylbenz- or naphth-indoles are obtained by treating hydroxyamines of the benzene or naphthalene series with benzoin.

354,485. DYES. W. W. Groves, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 21, 1930.

An arylide of the formula



where X represents alkyl or alkoxy and Y represents halogen or hydrogen, is coupled in substance or on the fibre with a diazo compound of an amino-terephthalic acid dialkyl ester, yielding orange shades fast to light and weather. Examples are given.

354,716. DYES. A. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 9, 1930.

An isatin-Bz-carboxylic acid or nuclear substitution product is condensed with hydroxy-thionaphthenes, indoxyls or nuclear substitution products, and the dyestuff acids treated with amino-anthraquinones or nuclear substitution products, and the dyestuff acids treated with amino-anthraquinones or nuclear substitution products. Alternatively, an isatin-Bz-carboxylic acid is treated with an amino-anthraquinone or nuclear substitution product, and the intermediate product condensed with hydroxy-thionaphthenes, indoxyls or nuclear substitution products Similar dyestuffs are obtained by condensing a hydroxy-thionaphthene-Bz-carboxylic acid or reactive $\bar{\alpha}$-derivative with the components employed for preparing indigoid dyestuffs, and treating the dyestuff acids with aminoanthraquinones. Coupling components include cyclic *o*-diketones or cyclic compounds containing a reactive $COCH_2$ group, or reactive -derivatives. The products surpass the known indirubin dyestuffs in tinctorial properties. A large number of examples are given.

354,783. MODIFIED CASTOR OIL; ESTER CONDENSATION PRODUCTS. J. Y. Johnson, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 9, 1930.

Castor oil, with or without mineral oil, is heated to 200°-260° C. in the presence of phosphoric acid and/or acid esters, so that it loses water, becomes soluble in mineral oil, and acquires drying properties similar to linseed or tung oil, and may be used in paints or in the manufacture of drying artificial resins. The solutions in mineral oil are used as lubricants. Examples are given.

354,798. OXIDATION OF ORGANIC COMPOUNDS. Imperial Chemical Industries, Ltd., Millbank, London, and H. L. Riley, Imperial College of Science and Technology, South Kensington, London. Application date, February 15, 1930.

Organic carbonyl compounds having directly attached to the carbonyl group at least one methylene or methyl group are treated with selenium dioxide, selenious acid or a selenite, at 50°-150° C. in the presence of a diluent or excess of the carbonyl compound, whereby more highly oxygenated compounds are obtained. Acetone is oxidised to pyruvic aldehyde, methylethyl ketone to diacetyl and ethyl-glyoxal, diethyl ketone to β-γ. diketo-*n*-pentane, acetophenone to phenyl-glyoxal, propiophenone to acetyl-benzoyl, cyclo-hexanone to cyclohexa-1 : 2-dione, acetaldehyde to glyoxal propionaldehyde to methyl-glyoxal, butyraldehyde to ethyl-glyoxal ethyl- malonate to ethyl-mesoxalate, and ethyl-acetoacetate to ethyl-α-β-diketo-butyrate.

354,818. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 14, 1930. Addition to 299,721 (see THE CHEMICAL AGE, Vol. xx, p. 13.)

Hydroaromatic-nitronaphthalic acid imides are reduced by hydrosulphite or bisulphite, causing the entrance of a sulphonic acid group, to obtain acid wool dyes.

354,851. WETTING AGENTS. H. T. Böhme Akt.-Ges., 29 Moritzstrasse, Chemnitz, Germany. International Convention date, June 17, 1929. Addition to 318,610.

Aliphatic alcohols containing at least 9 carbon atoms in the molecule are treated with oleum or chlorsulphonic acid in the presence of inorganic or organic acid anhydrides or chlorides to obtain esters which are used in the acid felting of wool.

354,093. CALCIUM HYPOCHLORITE. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, September 17, 1929.

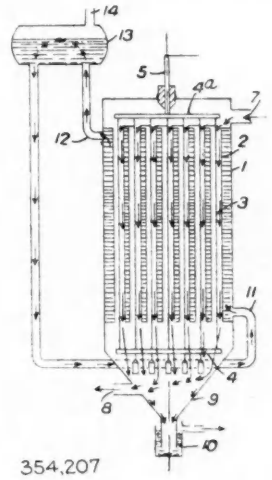
Calcium hypochlorite crystals which have been separated from calcium chloride liquor by centrifuging or pressing, are freed from adherent liquor by mixing with the necessary quantity of finely divided anhydrous sodium sulphate or carbonate, the corresponding calcium salt formed being insoluble. The product is then dried.

354,096. PHOTO-CHEMICAL OXIDATIONS. I. Kredl, C. Rosen, K. Rutter, 5 Sebastian Kohlgasse, Vienna. Assignees of F. Nozicka, 4 Schubertgasse, Vienna. International Convention date, October 19, 1929.

Organic or inorganic compounds are oxidised by irradiation in the presence of oxygen, a catalyst of the anthraquinone type, and an auxiliary accelerating catalyst such as an alkali, *e.g.*, soda, potash, or lime, an adsorbent, *e.g.*, carbon, silica gel, Fuller's earth or clay, or metallic oxide or salt of copper, bismuth, iron, vanadium or silver. Examples are given of the oxidation of toluene in the presence of anthraquinone, and granular carbon, to benzoic acid; paraffin oil in the presence of anthraquinone, and granular carbon, to benzoic acid; paraffin oil in the presence of anthraquinone and caustic soda to fatty acids; lepidine in the presence of anthraquinone and iron cinchonate to 2-hydroxy-quinoline-4-carboxylic acid; chromic sulphate is precipitated by caustic soda and oxidised to chromic acid in the presence of granular carbon; hydrogen sulphide or sulphur dioxide to sulphuric acid in the presence of granular carbon; and benzene is chlorinated by oxidation in the presence of hydrochloric acid, anthraquinone, and ferric oxide.

354,207. SULPHUR. D. Tyrer, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, May 3, 1930.

Gases containing sulphur in low concentration are cooled to 115°-150° C. at which temperature liquid sulphur is mobile, and the sulphur is precipitated electrostatically in the cooling vessel. The gases pass through tubes 2, in a waste boiler



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or steam heater at such pressure that the required temperature is maintained in the gas. Electric conductors 3, pass through the tubes and are stretched between bars 4, 4a. Gases at 250° C. enter at 7, and leave at 8, and the deposited sulphur is collected at 10. Water from a boiler 13, circulates through tubes 11 and 12, and steam is drawn off at 14.

354,394. SULPHIDES. J. C. Patrick, 201 Cadwalader Drive, Trenton, N.J., U.S.A. International Convention date, June 10, 1929.

Polysulphides of alkali and alkaline earth metals, *e.g.*, $Na_2S_{2.2}$ are obtained by treating the metallic hydroxide with the necessary quantity of sulphur.

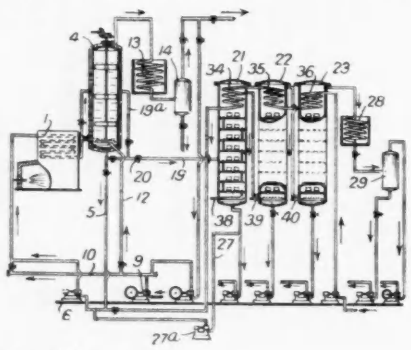
354,451. SODA, POTASH, AND AMMONIUM CHLORIDE. Chemie-Verfahren Ges., 15 Wilhelmstrasse, Bochum, Germany. International Convention date, July 13, 1929.

This specification describes a cyclic process consisting of five separate steps for producing soda potash, and ammonium chloride from sylvinite, ammonia, and carbon dioxide.

354,478. DESTRUCTIVE HYDROGENATION. Standard Oil Development Co., Linden, N.J., U.S.A. Assignees of P. L. Young, 72 Barrow Street, New York. International Convention date, July 22, 1929.

Crude heavy oils are heated to 700°-850° F. and a pressure of 200 atmospheres or more in the presence of gases rich in

hydrogen and a catalyst. The oil is hydrogenated, light oils being vaporised, and fresh oil and gases rich in hydrogen are added. Gases and vapours are separated under pressure, and the pressure is then reduced on the liquid portion to allow evaporation, and the vapour is condensed. The oil is circu-



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lated through heating coil 1, and reaction vessel 4, by a pump 6, and hydrogen is supplied by a pump 9, through pipes 10, 12. Vapour passes to condenser 13, and separator 14, under pressure. Liquid is drawn off by pipe 19 through reducing valve 20, and vaporises in a column 21. Vapour condenses in columns 22, 23 and condenser 28, and gases are separated in the vessel 29, the fractions obtained being lubricating oils. Heating coils 34, 35, 36 are provided to control the temperature, and steam may also be admitted. Less than 20 per cent. of light oil boiling below 400° F. is obtained.

Specifications Accepted with Date of Application

360,355. Vat dyestuffs and intermediate products, Manufacture of. C. Shaw, R. F Thomson, J. Thomas, and Scottish Dyes, Ltd. April 24, 1930.

360,356. Metalliferous azo-dyestuffs, Manufacture of. Soc. of Chemical Industry in Basle. July 3, 1929.

360,368. Molecular compounds of the alkali metal, alkaline earth metal, and magnesium salts of 2-phenyl-quinoline-4-carboxylic acid with 1-phenyl 2 : 3-dialkyl 4-dialkylamino-5-pyrazolones, Production of. R. Adler and O. Adler. November 14, 1929.

360,378. Water-soluble, non-dyeing derivatives of sulphurised phenols, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). August 2, 1930.

360,422. Lead Alloys. H. Harris. May 6, 1930.

360,424. Carrying out reactions under high pressure. J. Y. Johnson. (*I. G Farbenindustrie Akt.-Ges.*). June 4, 1930.

360,436. Titanium pigments and their manufacture. J. Blumenfeld. August 2, 1930.

360,489. Ammonium sulphate and nitrogen, Preparation of. D. Vorlander and A. Lainau. August 21, 1929.

360,490-1. Natural rubber, etc., Vulcanisation of. A. Carpmael. (*I. G. Farbenindustrie Akt -Ges.*). August 9, 1930.

360,492. Alcohol and ether, Manufacture of. Distillers Co., Ltd., W. P. Joshua and H. M. Stanley. August 9, 1930.

360,493. Derivatives of ethers, Manufacture of. J. Y. Johnson. (*I. G. Farbenindustrie Akt -Ges.*). July 7, 1930.

360,501. Salts of a quinoline sulphonic acid readily soluble in water, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt.-Ges.*). August 12, 1930.

360,503. Barium monoxide, Production of—in tunnel ovens. C. H. Thompson, H. E. Alcock and G. T Shine. August 13, 1930.

360,522. Dyes, Production of. H. T. Bucherer. August 19, 1929.

360,530 and 360,814. Hydrocarbon oils, Purification of. Standard Oil Development Co. August 31, 1929.

360,533. 4 : 5-Dimethyl-7-chloro-oxythionaphthene and indigoid dyestuffs therefrom, Manufacture of. A. Carpmael. (*I. G. Farbenindustrie Akt -Ges.*). August 22, 1930.

360,558. Chlorethane sulphonic acid and salts thereof, Manufacture of. I. G. Farbenindustrie Akt.-Ges. September 5, 1929.

360,583. Vat dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. September 25, 1929.

360,602. Wetting, penetrating, foaming, and dispersing agents. H. T. Bohme Akt.-Ges. November 4, 1929.

360,613. Recovering acid ammonium carbonate from ammonia liquors. R. Maclaurin. October 14, 1930.

360,618. Mixtures of nitrogen and hydrogen from bituminous fuels, Production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). October 15, 1930.

360,621 Cyanamide and like compounds, Production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*). October 17, 1930. Addition to 332,584.

360,720. Benzol recovery from distillation gases. H. Melches. December 16, 1930.

360,746. Zinc oxide, Production of. Zinkhutte Neu-Erlaa Ges. January 21, 1930.

360,750. Hydrogen by iron-water reaction. Soc. Des Mines de Dourges. February 28, 1930.

360,758. Beryllium oxide or hydroxide, Production of. Siemens & Halske Akt.-Ges. June 4, 1930.

360,765. Calcium carbide and phosphorus, Production of. N. Caro and A. R. Frank. February 7, 1930.

360,770. Vat dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. February 26, 1930. Addition to 298,284.

360,778. Nitric acid by oxidation of ammonia, Manufacture of. F. A. F. Pallemaerts and Union Chimique Belge, Soc. Anon. February 27, 1931.

360,789. Refining of metals. American Smelting and Refining Co. March 29, 1930.

360,798. Monoazo dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. April 11, 1930.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Bakelite, Ltd. Resinous compositions. 32009. November 18.

Bloxam, A. G. (*Society of Chemical Industry in Basle.*) Manufacture of intermediate products and dyestuffs therefrom. 31877. November 17.

—— Manufacture of sulphonation products from higher fatty acids &c. 32003. November 18.

Boake, Roberts, & Co., Ltd., A., and Carroll, N. F. Manufacture of fertilising agent. 32012. November 18.

Cellulose Acetate Silk Co., Ltd. Manufacture of artificial silk. 32133. November 19.

Chemische Fabrik Budenheim Akt.-Ges. Rinsing, cleansing, and fat-removing agents. 32257. 32258. November 20. (Germany, December 1, '30).

—— Preparation of cleansing-agents. 32259. November 20. (Germany, December 11, '30).

Dewey & Almy, Ltd. Manufacture of soda-lime. 32266. November 20. (United States, December 22, '30.)

Duckham, A. M., and Woodall-Duckham (1920), Ltd. Manufacture of sulphuric acid. 31812. November 17.

Einstein's Electro Chemical Process, Ltd. Fungicides. 31860. November 17.

Goodlass Wall & Lead Industries, Ltd., Hulme, W., Jones, B., and Singleton, W. Manufacture of lead &c. 32145. November 19.

I. G. Farbenindustrie Akt.-Ges. Manufacture of sulphur dyestuffs. 31995. November 18. (Germany, February 6.)

Imperial Chemical Industries, Ltd., and Hodgson, H. H. Treatment of dinitronaphthalene. 31900. November 17.

—— and Hill, R. Manufacture of polymerization product and moulded bodies therefrom. 31901. November 17.

—— and Lawrie, L. G. Treatment of acyl and alkyl cellulose derivatives. 31902. November 17.

—— Holroyd, R., and Somerset, H. B. Destructive hydrogenation of carbonaceous materials. 31903. November 17.

—— Liquefaction and gasification of solid carbon dioxide. 32252. November 20.

—— Barrell, K. C., and Goodfellow, B. R. Carrying out gaseous chemical reactions with catalysts. 32253. November 20.

Improved Hydro-Carbon Processes, Ltd. Refining hydrocarbons. 32146. November 19. (France, January 20.)

—— Refining hydrocarbons. 32147. November 19. (France, January 29.)

Johnson, J. Y. (*I.G. Farbenindustrie Akt.-Ges.*). Manufacture of assistants for textile &c. industries. 32108. November 19.

—— Johnson, J. Y. Manufacture of hydrocarbons. 32290. November 21. (August 20, '30.)

Johnson, J. B. E. Desiccation or drying of chemical &c. materials. 31909. November 17.

—— Manufacture of chemical products. 31910. November 17.

Llewellyn, I. P., and P. Spence & Sons, Ltd. Production of preparations of titanium salts &c. 31652. November 16.

Marinot, A. Manufacture of boron. 32205. November 20. (France, January 10.)

Neuss, O. Manufacture of condensation products of urea &c. 32335. November 21.

Processco, Ltd. Hydrogenation. 31743. November 16. (United States, December 13, '30).

Siemens-Elektro-Osmose Ges. Purifying glycerine. 32251. November 20. (Germany, December 18, '30.)

Silica Gel Corporation. Catalytic or adsorption processes. 32267. November 20. (United States, November 21, '30.)

Silica Gel, Ltd. Refrigeration apparatus. 32319. November 21.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID, ACETIC, 40% TECH.—£18 15s. per ton d/d address U.K. in casks.

ACID CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 10d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8½d. per lb., d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 19s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £15 10s. per ton; granulated, £14 10s. per ton; powder, £16 per ton. (Packed in 1 cwt. bags, carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards.)

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d station in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 11d. to 2s. 4d. per gall.; pyridinised industrial, 2s. 1d. to 2s. 6d. per gall.; mineralised, 3s. to 3s. 4d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4½d. per lb. net d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb. ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.

SALAMMONIAC.—First lmp, spot, £40 17s. 6d. per ton d/d address in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 10s. per ton d/d station in bulk.

SODA ASH, 58%.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77° E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS, CAKE, GRANULAR, AND POWDER.—3½d. per lb. net d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£16 10s. per ton delivered 1-cwt. iron drums for home trade.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3¾d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SILICATE., 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton, d/d in drums. Crystals—Spot, £8 5s. per ton, d/d in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton; d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 6¼d. per lb. Crude 60's 1s. 4d. to 1s. 5d. per gall.

ACID CRESYLIC 99/100.—1s. 8d. to 1s. 9d. per gall. B.P., 2s. 6d. to 3s. per gall. Refined, 2s. to 2s. 2d. per gall. Pale, 98%, 1s. 7d. to 1s. 8d. Dark, 1s. 4d. to 1s. 4½d.

ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.

BENZOLE.—Prices at works: Crude, 7d. to 7½d. per gall.; Standard Motor, 1s. 2d. to 1s. 3d. per gall. 90%.—1s. 3d. to 1s. 4d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

TOLUOLE.—90%, 2s. per gall. Pure, 2s. 3d. per gall.

XYLOL.—2s. per gall. Pure, 2s. 3d. per gall.

CREOSOTE.—Standard specification, for export, 4¾d. to 5d. net per gall. f.o.b.; for Home, 3¾d. per gall. d/d.

NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent, 90/190, 11d. to 1s. 2d. per gall.

NAPHTHALENE.—Purified Crystals, £11 10s. per ton, in bags.

PITCH.—Medium soft, 70s. per ton, in bulk at makers' works.

PYRIDINE.—90/140, 3s. 6d. to 3s. 9d. per gall. 90/160, 3s. 3d. to 3s. 6d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID GAMMA.—Spot, 3s. 3d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 2d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.

m-CRESOL 98/100%.—2s. 0d. per lb., in ton lots.

p-CRESOL 34.5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., packages extra, d/d buyer's works.

DINITROBENZENE.—7¾d. per lb.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d.-8d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 9d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 10½d. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra, d/d buyers' works.

NITRONAPHTHALENE.—8¾d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 6d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 6d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 3d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—£7 5s. to £7 10s. per ton. Grey, £12 per ton. Liquor, 8d. to 9d. per gall.

ACETIC ACID, TECHNICAL, 40%.—£15 15s. per ton.

ACETONE.—£63 to £65 per ton.

AMYL ACETATE, TECHNICAL.—80s. to 90s. per cwt.

CHARCOAL.—£6 to £9 per ton, according to grade and locality.

IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gall.

METHYL ACETONE, 40/50%.—£48 per ton.

RED LIQUOR.—16° Tw., 8½d. to 10d. per gall.

WOOD CREOSOTE.—1s. to 2s. 6d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gall. Solvent, 3s. 6d. to 4s. 6d. per gall.

WOOD TAR.—£2 to £6 per ton.

BROWN SUGAR OF LEAD.—£32 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 1d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 5d. to 1s. 7d. per lb.

BABYTES.—£7 to £8 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 3d. to 3s. 6d. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON, BLACK.—3½d. to 4½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—2s. 6d. per lb.

INDIARUBBER SUBSTITUTES, WHITE.—4d. to 5½d. per lb.; Dark, 4d. to 4½d. per lb.

LAMP BLACK.—£37 to £40 per ton.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£12 5s. to £15 15s. per ton.

MINERAL RUBBER "RUPRON."—£17.

PIPERIDINE RUBBER ACCELERATORS.—P.P.D., 10s. 6d. to 11s. 6d. per lb.; Z.P.D., 7s. to 7s. 6d. per lb.; L.P.D., 6s. 6d. to 7s. per lb.; P.T.D., 9s. 8d. to 10s. 4d. per lb.; C.P.D., 8s. 3d. to 8s. 10d. per lb.; S.P.D., 8s. 1d. to 8s. 7d. per lb.; Suparac, Standard, 7s. per lb.; Suparac, Z, 3s. 6d. per lb.

SULPHUR CHLORIDE.—4d. to 7d. per lb., according to quality.

SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

SULPHUR PRECIP. COMMERCIAL.—£45 to £55 per ton.

VERMILION, PALE OR DEEP.—6s. 8d. to 6s. 10d. per lb.

ZINC SULPHUR.—10d. to 1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACETANILIDE.—1s. 5d. per lb.

ACID, ACETIC, PURE, 80%.—£37 5s. per ton d/d address U.K. in casks.

ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.

ACID, BENZOIC B.P.—1s. 10d. per lb., for 1-cwt. lots. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £34 per ton; powder, £35 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 0½d. per lb., less 5%.

ACID, GALLIC.—2s. 9d. per lb., for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. to 6s. 3d. per lb. according to quantity. Packages extra.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. for 28-lb. lots; Resublimed, 8s. 6d. per lb. for 28-lb. lots, d/d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%.

AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.

AMMONIUM BENZOATE.—3s. 6d. per lb.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.

AMMONIUM MOLYBDATE.—5s. to 6s. 3d. per lb. according to quantity. Packages extra.

ATROPHINE SULPHATE.—7s. to 7s. 6d. per oz., according to quantity.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—2s. 10d. per lb.

BISMUTH CARBONATE.—7s. 9d. per lb.

BISMUTH CITRATE.—9s. 2d. per lb.

BISMUTH SALICYLATE.—7s. 9d. per lb.

BISMUTH SUBNITRATE.—6s. 6d. per lb.

BISMU H NITRATE.—Cryst. 5s. 1d. per lb.

BISMUTH OXIDE.—11s. 1d. per lb.

BISMUTH SUBCHLORIDE.—10s. 9d. per lb.

BISMUTH SUBGALLATE.—7s. 4d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth sales respectively.

BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W.Qts. 1s. 2d. per lb.; 6 W. Qts. 11½d. per lb.; 12 W. Qts. 10d. per lb.; 36 W. Qts. 9½d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Q.s. 10d. per lb.; 36 W. Qts., 9½d. per lb.

BORAX B.P.—Crystal, £23 10s. per ton; powder, £24 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.

BROMIDES, B.P.—Ammonium, 1s. 8d. per lb.; potassium, 1s. 5d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.

CAFFEIN, PURE.—6s. 6d. per lb.

CAFFEIN CITRAS.—5s. per lb.

CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., according to quantity.

CAMPHOR.—Refined flowers, 3s. 2d. to 3s. 4d. per lb., transparent tablets, 3s. 5d. to 3s. 7d., according to quantity; also special contract prices.

CHLORAL HYDRATE.—2s. 11½d. to 3s. 1½d. per lb.

CHLOROFORM.—2s. 4d. per lb.

ETHERS.—S.G. .730—1s. 1d. to 1s. 2d. per lb., according to quantity; other gravities at proportionate prices.

FORMALDEHYDE, 40%.—30s. per cwt. in barrels, ex wharf.

GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.

HEXAMINE.—1s. 10d. to 2s. per lb., according to quantity.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.

HYDROQUINONE.—4s. 7d. per lb. in 1-lb. lots; 3s. 5¾d. per lb. in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; for 28-lb. lots.

IRON AMMONIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 7d. per lb. list price.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz.

MAGNESIUM CARBONATE.—Light B.P., 36s. per cwt.

MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 15s. 9d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 9s. 9d. per lb., according to quantity; Liquid (95%), 8s. per lb.

MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 7s. 7d. to 7s. 8d. per lb., levig. 7s. 1d. to 7s. 2d. per lb.; Corrosive Sublimate, Lump, 5s. 5d. to 5s. 6d. per lb., Powder, 5s. 1d. to 5s. 2d. per lb.; White Precipitate, Lump, 6s. 1d. to 6s. 2d. per lb.; Powder, 6s. 3d. to 6s. 4d. per lb.; Calomel, 6s. 3d. to 6s. 4d. per lb.; Yellow Oxide, 6s. 11d. to 7s. per lb.; Persulph, B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 5s. 7d. to 5s. 8d. per lb. Special prices for larger quantities.

METYL SALICYLATE.—1s. 4½d. to 1s. 6½d. per lb.

PARAFORMALDEHYDE.—1s. 6d. per lb.

PARALDEHYDE.—1s. 1d. per lb.

PHENACETIN.—4s. to 4s. 3d. per lb.

PHENOLPHTHALEIN.—4s. 4d. to 4s. 6d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—90s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P., 1s. 7d. per lb. for 28-lb. lots.

POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.

POTASSIUM IODIDE.—B.P., 21s. 11d. to 24s. 11d. per lb., as to quantity.

POTASSIUM METABISULPHITE.—50s. per cwt. d/d London, kegs free.

POTASSIUM PERMANGANATE.—B.P. 7d. per lb. for ton lots.

QUININE SULPHATE.—2s. 2d. per oz. for 1,000-oz. lots.

SACCHARIN.—43s. 6d. per lb.

SALICIN.—16s. 6d. to 17s. 6d. per lb., according to quantity.

SILVER NITRATE.—10d. per oz. for 500-oz. lots, sticks, 2d. per oz. extra.

SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.

SODIUM BENZOATE B.P.—1s. 7d. per lb.

SODIUM CITRATE.—B.P.C. 1911, 1s. 4d. per lb. B.P.C. 1923, and U.S.P., 1s. 8d. per lb., for 28-lb. lots.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—73s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£26 to £28 per ton, according to quantity. Delivered U.K.

STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.

TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.

THYMOL.—Puriss, 6s. 1½d. to 7s. per lb., according to quantity. Natural, 12s. per lb.

ZINC STEARATE.—1s. 4d. to 1s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—8s. 9d. per lb.

AMYL ACETATE.—2s. 3d. per lb.

AMYL BUTYRATE.—4s. 9d. per lb.

AMYL CINNAMIC ALDEHYDE.—9s. per lb.

AMYL SALICYLATE.—2s. 9d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—3s. per lb.

BENZYL ACETATE FROM CHLORINE-FREE ALCOHOL.—1s. 9d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.

BENZYL BENZOATE.—2s. 2d. per lb.

CINNAMIC ALDEHYDE NATURAL.—12s. 6d. per lb.

COUMARIN.—13s. per lb.

CITRONELLOL.—9s. per lb.

CITRAL.—6s. per lb.

ETHYL CINNAMATE.—8s. per lb.

ETHYL PHTHALATE.—2s. 6d. per lb.

EUGENOL.—7s. 6d. per lb.

GERANIOL.—7s. 3d. to 12s. per lb.

GERANIOL (FROM PALMAROSA).—17s. per lb.

HELIOTROPINE.—6s. per lb.

ISO EUGENOL.—9s. 6d. per lb.

LINALOL (EX BOIS DE ROSE).—5s. 6d. per lb.

LINALYL ACETATE, EX BOIS DE ROSE.—7s. 6d. per lb. Ex Shui Oil, 7s. 6d. per lb.

METHY ANTHRANILATE.—7s. per lb.

METHYL BENZOATE.—4s. 3d. per lb.

MUSE XYLOL.—6s. 6d. per lb.

PHENYL ETHYL ACETATE.—10s. per lb.

PHENYL ETHYL ALCOHOL.—8s. 6d. per lb.

RHODINOL.—40s. per lb.

SAFROL.—2s. per lb.

VANILLIN, EX CLOVE OIL.—16s. to 18s. per lb. Ex Guaiacol.—14s. 3d. to 16s. 3d. per lb.

Essential Oils

ANISE OIL.—2s. 6d. per lb.

BERGAMOT OIL.—10s. per lb.

CAMPHOR OIL.—White, 105s. per cwt.

CANANGA.—Java, 7s. per lb.

CASSIA, 80/85%.—4s. per lb.

CINNAMON OIL LEAF.—4s. per oz.

CITRONELLA OIL.—Java, 2s. 8d. per lb., c.i.f. Pure Ceylon, 2s. per lb.

CLOVE OIL, 90/92%.—5s. 6d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 4d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 10s. per lb.

LEMON OIL.—4s. 6d. per lb.

ORANGE, SWEET.—8s. per lb.

PALMA ROSA.—9s. per lb.

PEPPERMINT.—Wayne County 9s. per lb., Japanese 5s. per lb.

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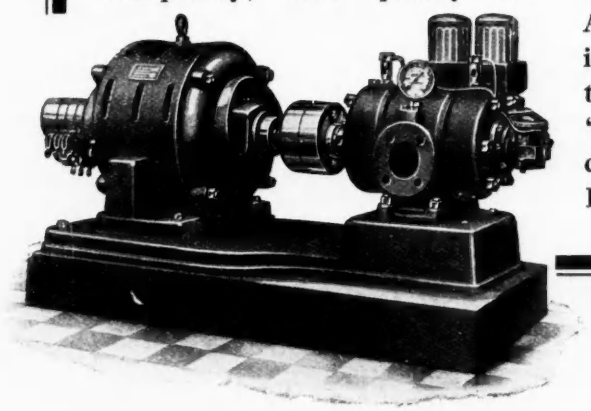

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London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, November 26, 1931.

MARKETS have received a steady volume of inquiry and in the aggregate a large amount of business has been placed. Prices continue firm with a tendency to settle at the higher levels recently reached. The forward position is still too uncertain to permit of any extensive sales incurring delivery beyond the next two or three months.

ACETONE.—The market remains very firm with the price advancing to a higgher level. Current price is about £62 to £65 per ton and there is a brisk demand.

ACID, ACETIC.—A steady day to day demand is being received with the market ruling firm at £36 5s. to £38 5s. for Technical 80% and £37 5s. to £39 5s. per ton for Pure 80%.

ACID, CITRIC.—The demand is rather subdued with the market firm at 1s. 0½d., less 5%.

ACID, FORMIC.—An active demand has been received with the price quoted higher at £48 per ton and supplies are rather short for early delivery.

ACID, OXALIC.—A brisk demand is being received and prices rule firm at £42 to £43 per ton.

ACID, TARTARIC.—A little more interest has been shown in this market with the price firm at 1s. 1d. to 1s. 1½d. per lb., less 5%.

ALUMINA SULPHATE.—In steady demand with conditions firm at about £8 10s. to £9 10s. per ton.

AMMONIUM CHLORIDE.—Rather more business is being placed with the Fine White Crystal quality quoted at about £18 per ton.

ARSENIC.—Conditions are still more or less nominal with Cornish material unobtainable for early delivery and the price nominal at £26 per ton f.o.r. Mines. Imported material is firm at about £24 per ton c.i.f.

BARIUM CHLORIDE.—In fair demand with the market steady at about £11 per ton.

CREAM OF TARTAR.—In better request with the market steady at 80s. 6d. to 89s. 6d. per cwt. less 2½%.

FORMALDEHYDE.—The market is ruling firm at about £28 per ton with an active demand.

LEAD ACETATE.—A steady trade has been concluded with the market exceptionally firm at £37 to £39 per ton for White, and Brown quality quoted at £1 per ton less.

LITHOPONE.—In steady demand at about £22 per ton.

POTASSIUM CHLORATE.—The product is in rather short supply for early delivery. Prices are firm at about £32 to £34 per ton.

PERMANGANATE OF POTASH.—Needle Crystals B.P. 7s. per lb. with a steady demand.

POTASSIUM PRUSSIATE.—The market is active at about 8½d. per lb. with conditions firm.

SODIUM ACETATE.—In short supply with the market firm at about £23 per ton.

SODIUM BICHROMATE.—The market is tending towards a higher level of prices. Current price is 3½d. per lb. with an active demand.

SODIUM CHLORATE.—In good request with the market steady at about £30 per ton.

SODIUM NITRITE.—In fair request at about £21 per ton.

SODIUM PRUSSIATE.—The market is active at about 4¾d. to 5¼d. per lb.

SODIUM SULPHIDE.—Concentrated solid and the broken quality have been advanced by 10s. per ton. Crystals quality 5s. per ton. There is an active demand.

ZINC SULPHATE.—In steady demand at about £12 per ton.

Coal Tar Products

PRICES of coal tar products are hardening, and while stocks remain low, inquiry is improving, especially for export. General prices are as below:—

MOTOR BENZOL.—Quoted at about 1s. 4½d. to 1s. 5½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Remains at about 1s. 1½d. to 1s. 2d. per gallen f.o.r.

HEAVY NAPHTHA.—Unchanged at about 11d. to 1s. 0½d. per gallon f.o.r.

CREOSOTE OIL.—Obtainable at about 3d. to 3½d. per gallon f.o.r. in the North, and at about 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Remains at about 1s. 6d. per gallon f.o.r. for the 98/100% quality, and at about 1s. 4d. per gallon for the Dark quality 95/97%.

NAPHTHALENES.—Quoted at about £2 5s. to £2 10s. per ton for the firelighter quality, at about £2 15s. to £3 per ton for the 74/76 quality, and at about £4 per ton for the 76/78 quality.

PITCH.—Unchanged, at about 60s. to 65s. per ton f.o.b. East Coast port.

Latest Oil Prices

LONDON, November 25.—LINSEED OIL was easy. Spot, ex mill. £17 10s.; December, £14 15s.; January-April, £15 17s. 6d.; May-August, £17, naked. RAPE OIL was slow. Crude, extracted, £30 10s.; technical, refined, £32 10s., naked, ex wharf. COTTON OIL was dull. Egyptian, crude, £20; refined common edible, £24; and deodorised, £26, naked, ex mill. TURPENTINE was steady. American, spot, 49s. 3d.; January-April, 50s. 6d. per cwt.

HULL.—LINSEED OIL.—Spot to April closed at £16; May-August at £17 per ton, naked. COTTON OIL.—Bombay crude, spot, not quoted; Egyptian crude, spot, £19 10s.; edible refined, spot, £22 10s.; technical, spot, £22 10s.; deodorised, £24 10s. naked. PALM KERNEL OIL.—Crude, naked, f.m.q., spot, £23 10s. GROUNDNUT OIL.—Crushed/extracted, spot, £28 10s.; deodorised, £32 10s. RAPE OIL.—Crushed/extracted, spot, £29 10s.; refined, £31 10s. SOYA OIL.—Crushed/extracted, spot, £20 10s.; deodorised, £24 per ton. COD OIL, 16s. per cwt. TURPENTINE.—American, spot, 51s. per cwt. CASTOR OIL.—Pharmacy, spot, 48s. 6d.; first, 43s. 6d.; second, 41s. 6d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—There were no features of interest during the week and the market remained unchanged at £5 5s. 0d. per f.o.b. U.K. port in single bags. *Home.*—There has been no change in price. It is understood that the extent of advanced bookings by merchants and farmers indicates that the consumption during the Spring will show a considerable advance on the Spring of 1931.

IMPORTED NITRATE OF SODA.—The price remains unchanged and no large sales have been reported.

BRITISH NITRATE OF SODA.—It is understood that several sales have been made and that consumers of the imported product are anxious to try the new British product.

NITRO-CHALK.—It is reported that considerable bookings are being made at the current price of £7 5s. 0d. per ton.

South Wales By-Products

THERE is scarcely any change in South Wales by-product activities. The call for pitch is slightly better, but, with the patent fuel outlook uncertain, most of the business done is confined to small prompt parcels. There is no change in values. Road tar has only a moderate call with prices steady around the 13s. per 40-gallon barrel mark. Refined tars remain quiet, with quotations for gasworks and coke-oven tar unchanged. Naphthas have a dull market. Heavy naphtha has scarcely any call, while the demand for solvent is small and sporadic. Creosote remains weak, but motor benzol continues to be a fairly bright feature. Patent fuel and coke exports are far from satisfactory. Patent fuel prices for export are: 19s. to 19s. 6d. ex-ship Cardiff; 18s. to 18s. 6d. ex-ship Swansea. Coke prices are: Best foundry, 32s. 6d. to 36s. 6d.; good foundry, 22s. 6d. to 25s.; furnace, 16s. to 17s. 6d.

Scottish Coal Tar Products

COMPARATIVELY few orders have been placed during the week. Distillers are not too anxious to sell, however, as stocks are not high and better prices may be obtained at a later date. Cresylic acid and water white products remain dull.

CRESYLIC ACID.—Prices are easy with orders few and far between. Pale, 99/100 per cent., 1s. 5d. to 1s. 6d. per gallon; pale, 97/99 per cent., 1s. 3d. to 1s. 4d. per gallon; dark, 97/99 per cent., 1s. 2d. to 1s. 3d. per gallon; all f.o.r. makers' works in reasonable quantities. High boiling acid is now on offer at from 2s. 6d. to 3s. per gallon ex works.

CARBOLIC SIXTIES.—Prompt production is well looked after and prices for forward are steady. Value is not below 1s. 6½d. to 1s. 7½d. per gallon ex works naked according to quality.

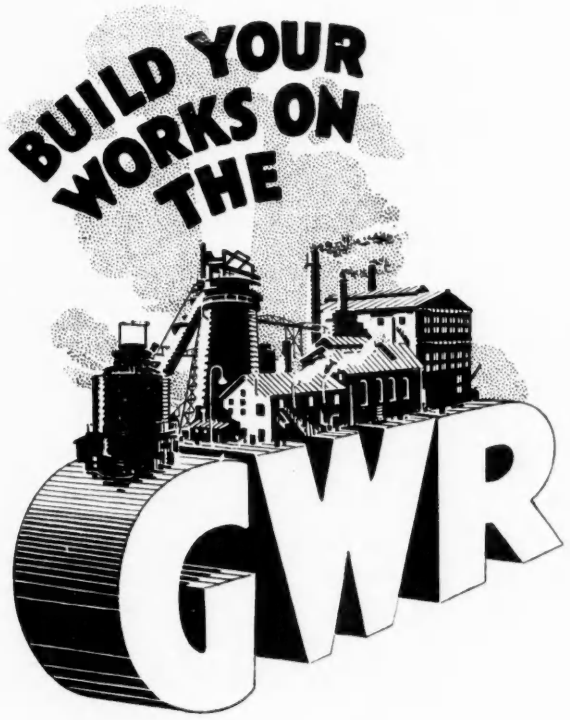
CREOSOTE OIL.—Conditions are reasonably steady in this market. Specification oils, 2½d. to 3d. per gallon; washed oil, 3¼d. to 3½d. per gallon; gas works ordinary, 3½d. to 3⅝d. per gallon; all free on rails makers' works in bulk.

BLAST FURNACE PITCH.—Controlled prices remain unchanged at 40s. per ton f.o.r. works, and 45s. per ton f.a.s. Glasgow for export.

REFINED COAL TAR.—With the main distillers refusing to quote at present value is nominal at about 4d. per gallon ex works in buyers' packages.

BLAST FURNACE TAR.—Remains nominal at 2¾d. per gallon f.o.r.

WATER WHITE PRODUCTS.—Stocks are accumulating and prices are easy. Motor Benzole, 1s. 3½d. to 1s. 4½d. per gallon; 90/160 solvent, 1s. 2½d. to 1s. 3½d. per gallon; and 90/190 Heavy Solvent, 1s. 0½d. to 1s. 1½d. per gallon; all in bulk ex works.



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Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Chas. Tennan and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, November 26, 1931.

THE Scottish heavy chemical market still shows definite improvement and export inquiries are numerous.

ACETONE.—B.G.S.—£65 to £68 per ton, ex wharf, according to quantity.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £25 per ton; crystals, £26 per ton; B.P. crystals, £34 per ton; B.P. powder, £35 per ton, in 1-cwt. bags, delivered Great Britain free in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at £42 to £43 per ton, ex store.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality. £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 1s. to 1s. 0½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted round about £8 10s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 10s. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station.

ANTIMONY OXIDE.—Spot material obtainable at round about £36 per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £25 10s. per ton, ex wharf. Spot material still on offer at £26 per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. to £11 10s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r works, or £4 12s. 6d. per ton, fo.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £29 per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station.

LEAD, RED.—Price now £30 per ton, delivered buyer's works.

LEAD, WHITE.—Quoted £40 per ton, carriage paid.

LEAD ACETATE.—White crystals quoted round about £35 to £36 per ton c.i.f. U.K. ports. Brown on offer at about £1 jer ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 10s. per ton, ex store.

METHYLATED SPIRIT.—Industrial quality 64 o.p., quoted 2s. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4½d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £27 per ton ex store.

POTASSIUM CHLORATE.—99¾/100% Powder.—Quoted £34 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUJ PERMANGANATE B.P. CRYSTALS.—Quoted 6½d. per lb. ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 8d. per lb., ex store.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77%, £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums; all carriage paid buyer's station, minimum four-toun lots; for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Price not yet fixed.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Price, 60s. per ton, ex works; 65s. per ton, delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyer's works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £13 per ton; roll, £11 10s. per ton; rock, £10 5s. per ton; ground American, £9 10s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 10s. per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

The British Cyanides Co. Ltd.

Points from Annual General Meeting

THE annual general meeting of the British Cyanides Co., Ltd., was held in London on Wednesday, November 18, Mr. C. F. Rowsell (the chairman) presiding.

In the course of his speech the Chairman said the year under review had undoubtedly been one of the worst for business within living memory, and in those circumstances the fact that the company had not only maintained, but had increased its turnover and made a small profit must, he thought, be considered as not unsatisfactory. In addition, he might claim that during the year they had laid the foundations of a business upon which success could be built up. The trading profit, together with sundry small receipts, amounted to £21,960, against £24,388 in the previous year, and the balance of profit was £2,927, against £3,684. The liquid assets of the company, together with those belonging to their subsidiary companies, which were entirely owned by them, made a total (excluding the £35,000 loan to which the auditors drew attention as not being fully secured) of £62,500.

Progress in the Plastic Industry

Reviewing the newer side of the company's business—that of the plastics industry—the Chairman said that two types of resin are now made by the British Cyanides Co., and handed over to the Beetle Products Co., Ltd., for conversion into moulding powder or for sale as resin. The two moulding powders, namely, Beetle and Beetle Industrial, already command substantial sale in this country and an expanding sale in other parts of the world but it was soon realised that the technique of handling this new type of moulding powder could only be developed to the best advantage by the company which makes the moulding powder working in close co-operation with a company whose sole business was to convert moulding powder into saleable mouldings. British Cyanides therefore acquired the Streetly Manufacturing Co., Ltd., whose main business was, and still is, the moulding of bakelite, though its output of Beatl-mouldings is increasing rapidly month by month. But even before the Streetly Manufacturing Co., Ltd., was acquired the necessity had arisen for assistance to be given to customers of the Beetle Products Co., Ltd., in marketing the new types of mouldings which Beetle powders made available to the public, and for this purpose the London selling organisation of your company was put at the disposal of the moulders and in due course Beatl Sales, Ltd., was formed. From now onwards there should be no doubt that the Streetly Manufacturing Co., Ltd., will prove a valuable ally to the Beetle Products Co., Ltd., in earning substantial profits for the group, instead of being a charge upon the revenues of the group.

What can you save by buying 'KEMET' acids and chemicals?

Kemet products are being used in preference to others for two chief reasons: their great purity, which in many cases effect great savings, and the excellent Kemet service and delivery arrangements.

May we send you samples of any of the following·

SULPHURIC ACID, all strengths, Oleum, Monohydrate, Battery Acid, Pure Acids, etc.

DIPPING ACID.

HYDROCHLORIC ACID, all strengths, Saltcake, Sodium Sulphate, Glaubers Salts, etc.

ZINC CHLORIDE, Zinc Sulphate, etc.

LIQUOR AMMONIA, all strengths, Liquor Ammonia Puriss, Sulphate of Ammonia, etc. Bisulphite of Soda.

RED LEAD and other products.

THE CHEMICAL & METALLURGICAL
CORPORATION LIMITED

Manufacturers of KEMET brand acids and chemicals.

RUNCORN, ENGLAND. *Telephone:* Runcorn 381

SELLING AGENTS:

BUSH, BEACH & GENT Ltd., Marlow House, Lloyd's Avenue, London, E.C. *Telephone:* Royal 7977

153, Edmund Street, Birmingham. *Telephone:* Central 3706

FRANK SEGNER & Co., Ltd., St. James's House, Brazennose Street, Manchester. *Telephone:* Blackfriars 7621

ILLUSTRATION SHOWS PART OF THE HYDROCHLORIC ACID PLANT.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, November 25, 1931.

The tone of the chemical market remains very steady all round, and here and there a rising tendency is in evidence. So far there has been little indication as to what the new 1931 prices will be in respect of the leading heavy products, and these are being awaited with more than usual interest in view of recent developments. In the meantime, although actual new business on this market is only on moderate lines, textile and certain other classes of chemicals are being taken up in reasonably satisfactory quantities against contract.

Heavy Chemicals

There is a moderate movement of saltcake, values of which range from £2 17s. 6d. to £3 per ton. Bicarbonate of soda keeps very firm at round £10 10s. per ton, and a quietly steady business in this material continues to be done. Caustic soda is quoted on the basis of £12 15s. to £14 per ton in contracts and according to quality, and fair deliveries are being made. There has been no particular weight about the demand for chlorate of soda during the past few days, but prices in this section keep up in the neighbourhood of £30 per ton. With regard to phosphate of soda, quiet sales are reported, with offers at from £12 10s. to £13 per ton for the dibasic material. Sulphide of sodium is quoted at last week's advance to £11 10s. per ton for the 60-62 per cent. concentrated solid quality, and £9 5s. per ton for the commercial crystals, both on the basis of ton lots. A fairly steady inquiry is about in the case of alkali, quotations for which are very firm at about £6 per ton. Prussiate of soda meets with a moderate demand and values are unchanged on balance at from 4¾d. to 5¼d. per lb., according to quantity. There has been no change in the price position of hyposulphite of soda, with sales on rather quiet lines; the photographic grade is offering at up to £15 10s. per ton and the commercial at £9 to £9 5s. Bichromate of soda continues to be quoted here on the basis of 3½d. per lb., and a quietly steady business has been done.

For the most part the potash products keep steady, although in one or two instances there has been a slight shading from the highest points touched during the recent advance. Permanganate is in quiet request, with the B.P. material quoted at about 6½d. per lb. and the commercial at 6¼d. Carbonate of potash is on offer at round £28 per ton, a quietly steady call being reported. Caustic potash is in moderate request at about £38 per ton. Chlorate of potash is quoted to-day at from £34 to £35 per ton. With regard to bichromate, this is selling in fair quantities and quotations are firm at about 5½d. per lb. Yellow prussiate of potash continues to be offered here at round 8½d. per lb.

No more than a quiet demand is being experienced for sulphate of copper, which is on the easy side at the moment at from £17 10s. to £18 per ton, f.o.b. Arsenic supplies are no freer than before so far as the British material is concerned and values are firm though largely nominal at £26 10s. per ton at Cornish mines. The acetates of lime are in moderate inquiry, with the grey quality at about £11 per ton and the brown at £7. The demand for acetate of lead this week has been on the quiet side but offers are firm at round £34 per ton for the brown grade and £35 for the white. Nitrate of lead is selling at round £29 per ton.

Acids and Tar Products

Acetic acid is in quiet demand with prices steady and unchanged at £51 per ton for the glacial technical and £38 5s. for the 80 per cent. commercial product. Oxalic acid is not attracting very much attention at the moment, offers being at up to £2 4s. per cwt., ex store. Tartaric acid is in moderate request at from 1s. 0½d. to 1s. 0¾d. per lb., and citric steady at about 1s. 1½d.

Pitch is in quiet demand, with offers ranging from about 60s. to 65s. per ton, f.o.b. Creosote oil is quiet for export, with the home consumption on a moderate scale; values are firm at from about 3½d. to 4¾d. per gallon, naked, according to quality. Solvent naphtha is firm at from 1s. 3½d. to 1s. 4d. per gallon, naked, a quietly steady business being put through. Carbolic acid is about maintained at 1s. 6d. to 1s. 7d. per gallon for crude 60's; 6d. per lb. for crystals.

Company News

N. V. Unilever.—It is announced that the half-yearly dividend on the 7 per cent. cumulative preference shares will be payable on and after December 1.

Reckitt and Sons, Ltd.—An interim quarterly dividend of 1s. per share has been declared payable on January 1, on the ordinary shares.

Tate and Lyle, Ltd.—Statement issued shows that the gross profit for the past year is £992,731, comparing with £385,938 in the previous year. The directors propose a final dividend on the ordinary shares of 9½ per cent., making 13½ per cent. for the year.

British Cotton and Wool Dyers' Association.—A net loss is reported for the half year to September 30, of £2,567, which compares with a net loss of £3,111 in the corresponding period of 1930. A balance of £33,398 was brought in and £30,830 remains to be carried forward, no interim dividend being recommended.

Lydenburg Platinum.—The profit for the year to June 30 last amounted to £6,790 (against £19,122) to which is added sundry revenue, £440 and balance brought forward £9,087, giving £16,317. From this is deducted London and Johannesburg expenses, costs connected with closing down at end November, 1930, caretaking, &c. £9,848, leaving credit balance to be carried forward of £6,469.

Broken Hill South.—The report for the year ended June 30, 1931, states that operations resulted in a net profit of £50,276, as compared with £282,268. Profit from investment section (£115,698) compares with profit of £107,207 last year, and makes full provision for taxation (£5,000). Loss on mining section (£65,422) compares with profit of £175,062, and is arrived at after providing £33,337 for depreciation at customary rate on mine plant. The balance brought forward was £181,711, to which is added the amount appropriated for plant and development, and not expended £17,853, and net profit for the year £50,277, making £249,841. Dividends Nos. 35-36 took £60,000, and there has been appropriation for plant and development £65,000, leaving balance of £124,841.

Increased Trade in British Zinc Oxides

In the course of his speech at the ordinary general meeting of The Zinc Manufacturing Co., Ltd., held at Winchester House, London, on Monday, November 23, Mr. H. Edwin Coley, the chairman of the company, who presided, said he wished to support the general commercial demand for Government action to assist the British manufacturer to keep the markets of his country, providing, of course, he can satisfactorily supply those markets. Spelter is a raw material for very important industries in this country. The output of spelter here is far below the consumption, and the prosperity of the industries in which spelter is used was an important point to the Company, whose process can produce spelter in competition with that imported from the Continent. The zinc oxide trade, however, was quite different. The total amount consumed in this country can be manufactured here. The highest qualities can be produced. Already the suspension of the gold standard has had the effect of a tariff. The case for protection in this trade has already been made out. In 1929, 12,144 tons were imported, and even in 1930 10,474 tons were sent in, and every ton can be produced here. Competition from abroad should at least be made difficult, and we should then be given a fair opportunity to recover from the devastating depression of the last two years. The first hopeful sign for the future came with financial and political action in this country, for then, the Company began to sell and are now selling zinc oxides at a profit per ton.

German Dye Trust Profits

The Board of the I.G. Farbenindustrie, in a report on the current year, issued November 22, state that sales have been steady in the company's old branches of manufacture, but in the new branches sales have been slow, especially as regards nitrogen and benzene. The board anticipates less favourable results than last year. Then 12 per cent. was paid, but this was made possible only by the Trust repurchasing its own shares. The financial situation is described as favourable, there being no liabilities to banks at home or abroad.

VITREOSIL CONTAINERS

Improvements in manufacture have made possible the production of containers or reaction vessels of large size. The picture shows one of 108 gallons capacity. It is 4ft. 6in. in height overall, and 2ft. 6in. internal body diameter.

THE THERMAL SYNDICATE LTD.

VITREOSIL WORKS, WALLSEND-ON-TYNE

LONDON DEPOT : THERMAL HOUSE, OLD PYE STREET, S.W.1.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CYPRUS SULPHUR & COPPER CO., LTD., London, S.W. (M., 28/11/31.) Registered November 13, series of £20,000 1st debentures, present issue £6,000; general charge. *£27,108. July 13, 1931.

Receivership

TINDALE ZINC EXTRACTION, LTD. (R. 28/11/31.) J. Miller, of Gibbs Chambers, Westgate Road, Newcastle-on-Tyne, was appointed receiver on November 7, 1931, under powers contained in debenture dated April 19, 1930.

New Companies Registered

BRANDON OILS, LTD. Registered November 16. Nominal capital £1,000 in £1 shares. Importers, distributors, manufacturers, blenders and sellers of oil products of all kinds, including motor spirit, lubricating oils, cleaning fluids, polishes, disinfectants, chemicals and chemical preparations, etc. Directors: B. Brandon, 445, Springvale Road, Crookesmoor, Sheffield. S. Kirkham, Edith A. Kirkham.

HEATERS, LTD., 20 Copthall Avenue, London, E.C. Registered November 13. Nominal capital £12,000 in £1 shares. To acquire the business of Klorex Syndicate, Ltd., in so far as such business relates to the manufacture of heaters for cardox cartridges and other purposes now carried on by them at Faversham, Kent, and elsewhere, and to carry on the business of manufacturing and operating chemists, manufacturers of explosives, etc. Directors: Sir Richard Redmayne, K.C.B., E. W. Janson, E. A. Loring, H. N. Wood.

INDUSTRIAL COLOURS, LTD. Registered November 18. Nominal Capital, £2,000 in £1 shares. Varnish, japan and colour manufacturers and merchants, importers and manufacturers of and dealers in chemical, industrial and other preparations and articles, tanning materials and extracts, etc. A subscriber. S. P. Lonergan, 29 Park Road, Ilford.

Chemical Trade Inquiries

These inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country) except where otherwise stated.

BRITISH EAST AFRICA.—A manufacturers' representative at Nairobi desires agencies for drugs and pharmaceutical preparations.

NEW ZEALAND.—An old-established firm of agents, with extensive connections throughout New Zealand wishes to obtain the representation of United Kingdom manufacturers of plaster of paris.

SOUTH AFRICA.—The Rand Water Board is calling for tenders, to be presented in Johannesburg by January 8, 1932, for the supply, delivery and erection of one vertical spindle centrifugal pump direct coupled to an electric motor. (Ref. G.X. 10942.)

POLAND.—A firm of agents established in Warsaw desire to enter into business relations with United Kingdom manufacturers and exporters of Petroleum jelly (technical and pharmaceutical), liquid paraffin, lubricants and machine oils.

PORTUGAL.—A firm of commission agents, etc., established at Oporto wishes to be placed in communication with United Kingdom suppliers of potato starch.

Trade of British Malaya

AN analysis of Malayan trade for the period January-June, 1931, discloses a serious decrease, both in imports and exports, as compared with the same period of the previous year. The total trade declined by no less a figure than $298 millions (£34.7 millions) the totals being $758 millions in 1930 and $460 millions in 1931. The decrease in imports amounted to $146 millions (£17 millions) or 37.6 per cent. and in exports to $152 millions (£17.7 millions) or 41 per cent. Imports for the six months exceeded exports by $23.7 millions (£2.7 millions), the totals being $242.1 millions (£28.2 millions) and $218.4 millions (£25.5 millions) respectively. During the first six months of 1930 imports also exceeded exports by a figure of $17.4 millions (£2 millions).

The striking decrease in the total value of exports is accounted for by the continued decline in world prices of primary products, among which Malaya's principal exports, rubber, tin, copra, etc., must be included. Dwindling export values, which have seriously reduced the purchasing power of the country as a whole, have necessarily resulted in a drastic curtailment of imports.

Swiss Methods of Trading

A COPY of a confidential memorandum on methods of trading, terms of payment and the appointment of agents in Switzerland prepared from information furnished by the Commercial Secretary to H.M. Legation at Berne has been issued by the Department of Overseas Trade to firms whose names are on its Special Register. British firms desirous of obtaining a copy of the memorandum together with particulars of the Special Register Service of information, should apply to the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1. Reference Number C.X. 3668 should be quoted.

Japanese Iodine and Camphor Exports

JAPAN exported more iodine during the first six months of 1931 than during that period of the preceding year. Exports were 33,000 lb., valued at $96,000, and 20,000 lb., valued at $74,000, respectively. Camphor exports during the first half of 1931 amounted to 1,800,000 lb., valued at approximately $885,000 compared with 1,200,000 lb. worth $715,000 during the corresponding period of 1930. Exports of camphor to the United States showed a gain to 810,000 lb. worth $433,500 during the first half of this year, from 520,000 lb. valued at $245,500 in the six-month period of 1930.

Copper Sulphate Trade of Brazil

THE Brazilian imports of copper sulphate declined from 1,334 metric tons in 1929 to 483 tons in 1930. The share of Great Britain fell from 1,101 tons to 389, and of Germany 104 to 87 tons. The total imports from United States during the two years were less than 4 tons. The prevailing price in August, 1931, was approximately £20 per metric ton, c.i.f. Rio de Janeiro and it was reported that the predominance of Great Britain in the trade was due to the inability of other countries to meet British quotations. Copper sulphate is used primarily in the vineyards as a fungicide and is consumed chiefly in the State of Rio Grange do Sul, the centre of the Brazilian wine industry.

Trade for Solvents and Flavours in Switzerland

NON-ALCOHOLIC solvents are not being imported into Switzerland in large quantities because of the low price of industrial grain alcohol. Terpeneless oils in small quantities are received from France and Germany. A limited demand for amyl ester is supplied chiefly from the Netherlands and Germany. Flavouring extracts used by Swiss confectioners are purchased almost entirely from German firms. Ethyl esters are manufactured domestically on a large scale and are not imported.

Saar Chemical By-Products Production

DURING the first six months of 1931 the Saar production of certain by-products in connection with the metallurgical industry was as follows: basic phosphate slag 137,460 metric tons, ammonium sulphate 12,077, benzol 15,633, and tar 59,074 metric tons. (Assistant Trade Commissioner Earle C. Taylor, Paris, France.)